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House of Commons

Science and Technology
Committee

GOVERNMENT FUNDING OF THE SCIENTIFIC LEARNED SOCIETIES

Fifth Report of Session 2001–02

Volume II

HC 774-II

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GOVERNMENT FUNDING OF THE SCIENTIFIC LEARNED SOCIETIES

Fifth Report of Session 2001–02

Volume II:
Minutes of Evidence and Appendices

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TAKEN BEFORE THE SCIENCE & TECHNOLOGY COMMITTEE

WEDNESDAY 8 MAY 2002

Members present:

Dr Ian Gibson, in the Chair

Mr Tom Harris	Dr Andrew Murrison
Mr David Heath	Bob Spink
Mr Tony McWalter	Dr Desmond Turner

Examination of Witnesses

LORD MAY OF OXFORD, a Member of the House of Lords, President, PROFESSOR JULIA HIGGINS DBE, Vice President and Foreign Secretary, and MR STEPHEN COX, Executive Secretary, the Royal Society, examined.

Chairman

1. Thank you very much, Lord May, for bringing your team along this afternoon to help us in our inquiry into government funding of the learned societies. Welcome, Mr Cox, and welcome, Professor Higgins. We have met as a Committee with yourselves in the past and we have joined in debates and so on. You know what we are looking at here, it is the government funding of learned societies and following you will be the Royal Academy of Engineering and we will have another session. We have not made up our minds about reports and so on yet, we will see how it proceeds. Let me lob you the easy one to begin with, Lord May. It is often said that we are tough on elitism and tougher on the causes of elitism in this country. How do you see elitism in terms of your organisation, the Royal Society, who get something like £30 million of Government funding? We have got an hour so we will all try to be short.

(*Lord May of Oxford*) I will try and be short too but if I may just quickly pause because I am not sure that all your members know the colleagues I have brought along. The Royal Society has five unpaid officers: Treasurer, Physical, Biological Secretary and the Foreign Secretary. We had a Foreign Secretary several decades before the United Kingdom had a Foreign Secretary so in some sense Julia has precedence over Jack Straw. Julia, like 10 per cent of our fellows, is also a Fellow of the Royal Academy of Engineering. She is currently the President of the Institute of Chemical Engineering, she is also a foreign member of the US Academy of Engineering. Stephen is our Executive Secretary, our, as it were, Permanent Secretary and our accounting officer. Back to your question, which I think is an excellent question. The word "elitism" I think is an unfortunate word because it has rebarbative edges to it in that it can connote a posh voiced product of a privileged upbringing. Equally, however, I would say that the Royal Society can in a different sense very fairly and willingly be characterised as an elite institution in that it seeks to support and recognise scientific excellence at every level and as the discussion progresses we will sketch some of the things we do in schools, the most important things we do oriented to younger scientists, the things we do to try and reach out more broadly and the things that we try to do in short recognising that science is an international activity. The Royal Society is a Commonwealth society, it elects people from all around the Commonwealth as well as Brits who live outside the country as well as non-Brits who live in the UK and Ireland. In everything it does it tries to foster and recognise and encourage excellent performance. If you will pardon an analogy that is directed, Chairman, at your past, I would say it is elite in the sense that the English soccer team is elite. That connotes a certain arbitrariness of choices too. I think it is probably much more democratically elected within its framework and the process of appointment is in a sense less autocratic than what Sven has for the England team. Different people might do it differently. You would be more expert than me and we may do shades of difference but there would be many people we would agree on. I say all that because if you do have an institution that stands for and recognises elite performance then you have got to be very self-conscious and self-examining to be sure you are doing it fairly and you are not just picking someone from Manchester United rather than someone from Tranmere by virtue of where they come from rather than how they perform.

Mr McWalter

2. I notice in your submission to us that you said "The election process for the fellowship is based on a rigorous peer review and we are constantly seeking ways to make this process as transparent and fair as possible. We have recently broadened and simplified the criteria for nomination to attract a higher number of women and candidates from emerging disciplines or bodies, although there are relatively few fellows". I am particularly interested in that business about how you represent newer sciences, systems engineering, bioinfomatics, theory of computer science, whatever, and the people making the elections may actually not have a clue about who are the leading practitioners in those areas, so you are not very well equipped to represent yourself as a

[**Mr McWalter** *Cont*]

cutting edge group. How would you respond to the criticism that where it is happening is not where you are?

(*Lord May of Oxford*) Again, excellent question. Let me just say the Society goes back 340 years, goes back to Charles II, one of whose contemporaries, Rochester, once said "Since 'tis nature's law to change constancy alone is strange". The one thing that characterises the 340 years' history with dips and rises is continual change. The reason we welcome this with such enthusiasm, as I think any occasion like this which is a different kind of prompt for self-examination, is that it is helpful. We have been engaged in that over the last couple of decades. Let me tell you a wee bit about the mechanics and then come to the gist, the real guts of your question. We have ten sectional committees that cover the waterfront of science in the broadest sense embracing medicine and engineering. At the same time the Society is in its very nature much more integrative of different disciplines than fissive of them, as so many other things are, as the RAE arguably is. On each of those ten committees half the membership turns over every year, the entire membership turns over every two years and none of the paper that we solicit from the short listed candidates—we solicit letters not just from here but also from other academicians in other countries—is kept year on year. People are up for election for seven years. In that sense it is very difficult for anything other than a large and highly organised clique to, as it were, keep people out but, on the other hand, it is a human institution and you have got to try very deliberately to guard about yesterday's hot subject having built a pyramid beneath it, electing more of it. Hence, I in particular worry a lot about newly emerging disciplines or about people, particularly the conjunction of the two, people in newly emerging disciplines who are in places that are not centres of science more generally. The example we elected last year who was overlooked for long year would be Tim Berners-Lee who created something very new but did it in a way that did not produce many scholarly publications and did it at a centre for elementary particle physics. What do we do to try and guard against that? Firstly, in every one of these sectional committees we now have a strict injunction "if you get before you a nominated candidate about whom nobody around the table feels expert in what they do then regardless of your impression that person is automatically short listed and letters are solicited". It is not perfect but it is a step. Secondly, and I think really quite important, we have set up a small committee of a group of the officers and a few other people that meets at the end of each cycle of elections to review what we just did, to look at the candidates' book and say "can we think of people who are being overlooked?" In conjunction with that last year I wrote to all Vice Chancellors and heads of major private and public research labs saying, just as I have said to you, "are there people we are overlooking? Make suggestions. We will not automatically put them in the candidates' book because if we really think it is not a good suggestion that is not doing anyone a favour but otherwise we will". Out of that process last year have come two of the 42 people we elected—we will elect tomorrow. One other point is worth emphasising. The Society's main criteria for election of mainstream candidates is contributions to pushing back the frontiers of knowledge in science, medicine and engineering. We have categories specially defined of applied and general candidates. Applied candidates are people whose contributions are not so much scholarly literature but are actually novelties in practical implementation of, say, fisheries policy or new advances in IT that are, in a sense, in practice rather than in academia. General candidates, the definition of which we have slightly simplified and I would say carried back more to the roots of the Society, are people who are notable figures in science by virtue of qualities primarily other than their own contributions to basic research either through writing, through leadership, through various forms of other iconic activity. By more rigorously enforcing a standing rule which we have had for a long time but which had tended to lapse in the enthusiasm of mainstream candidates to have more people like themselves last year and again this year we have a sprinkling of such people that I think hugely helpfully widens the breadth represented in the Society.

3. So you have got mechanisms in place then for overcoming the sins of the past?

(*Lord May of Oxford*) Or doing our best.

4. I do not know if Alan Turing was an FRS, perhaps you know?

(*Lord May of Oxford*) No, I do not know offhand but I am willing to give you heavy odds and bet he was.

5. You do not have a computing panel. Surely whatever the fads of fashion—

(*Lord May of Oxford*) Not true. One of the sectional committees, interestingly, is essentially an IT, computing panel.

6. So, for the British Computer Society who told us you did not have a computing panel, there is one but they just do not know about it?

(*Lord May of Oxford*) I get many interesting letters because if you try and carve the vast waterfront of science in the most general sense into ten boxes you put a lot of disparate people in one box. In the mathematics panel you put pure mathematicians, applied mathematicians, statisticians, and some people want to bring them together, other people want to emphasise differences. Feyman once, for example, did not endear himself to pure mathematicians by saying "Pure mathematics is like masturbating as distinct from theoretical physics or applied mathematics, which is like the real thing".

7. He had a turn of phrase, did he not?

(*Lord May of Oxford*) So too from time to time there will be different problematic committees. The one that puts together earth scientists, astrophysicists and the emerging but hugely important discipline that deals with climatology, that has uneasiness from time to time.

8. So despite the fact that computer science is at least as old as many of these other subjects, dates at least from Pascal and Leibnitz, there has been no British distortion because those were people who were marginalised by the Royal Society in its formative days but there is no effect of that now?

[**Mr McWalter** *Cont*]

(*Lord May of Oxford*) Not in its formative days, that was the 1600s. If you want to read a wonderful vituperative screed against the Royal Society I heavily commend to you Babbage in the middle of the 1800s on just this subject, it is really worth a read. Just to refine an answer I gave off the cuff, sectional committee one is pure and applied mathematics and computer science but it also embraces statistics. Other aspects of IT would be picked up in engineering.

Chairman

9. Just to come back to my original question about money to your Society. Other organisations have written to us and suggested that there could be a redistribution of that across the societies and a better working together. How would you respond to their comments on that?

(*Lord May of Oxford*) First, let me just give you a fact. The Society gets just over £25 million from the parliamentary grant-in-aid which accounts for 66 per cent of our income and just a shade over a third is money we raise from foundations, other private sources and so on and that private bit is up as a fraction. Just a few years ago the Parliamentary grant-in-aid was 78 per cent. Secondly, why do we have that money? Both parts of it have been increasing in recent years as the Office of Science and Technology—When I was head of the Office of Science and Technology I was more generous to the engineers than to the Royal Society, which people now keep reminding me of in both places. It has come in response to all of us putting initiatives to the Office of Science and Technology and the market, I would argue, working. The greatest single factor driving our increase in funds is they are throughput, they are not money we have, they are money we distribute as, as it were, a broker for OST. The biggest single chunk of that £25 million, about £16 million if my memory is correct, is for the university research fellowships of various kinds. That had a modest beginning about 20 years ago when the Royal Society was ahead of the game in recognising in the crunch of the Thatcher years that there were no job openings and we wanted to hold the best young people. We found some of our own money to do it. It was seen to be very successful and I passionately believe this is the best start to a career in science anywhere in the world, accidentally invented. Up to 10 years to do what you like where you like. Roughly half of them are people who are outside the golden triangle, roughly half inside the golden triangle, success rates are uniform from inside and outside. More than a third of them are women. Year on year we have been given more money to do more of this because we are seen to do it well and we do it so cheaply because nearly all the labour involved is the free labour of the fellowship and others that we engage in that process. I think any recommendation for a redistribution, which obviously I would reflexively resist and others would reflexively welcome, is a recommendation essentially to overturn the workings of peer review, the evaluative things and asking what is the best way to spend the money. I would very much hope, particularly from you, Chairman, and the spirit that we share that your recommendations would be much more along the line of asking for more money for everybody. I have got a wonderful plate of things that I want to offer for your endorsement.

10. We hear what you say. I will just declare an interest. I was a Research Fellow of the Royal Society, so let us get that out of the way so they cannot catch me out.

(*Lord May of Oxford*) We make mistakes.

Chairman: There is always one that slips in.

Dr Murrison

11. Lord May, it is impertinent for a Committee like this to get into the weeds of how you spend your money but seeing as you admit you receive such a large portion from the public purse we are enjoined to do so. One thing that I noticed particularly was what is described as "Russia, etc." in your break down of spend for 2001–02 and it is £600,000. That, as against the rest of your international support, strikes me as a great big chunk. I am fascinated to know why Russia has been so favoured.

(*Lord May of Oxford*) Before referring it to Julia and Stephen I would say for goodness sake, and this is not an apologetic note, it is good to be forced in a different way to examine yourself. Furthermore, you are constituted to ask us questions about the money, you are not constituted to ask us questions about how we elect people but I welcome that too because it is good to talk about it.

Chairman

12. That is a red rag to a bull, watch us go.

(*Professor Higgins*) I think the short answer would be that within Russia there are a lot of very interesting young scientists. There are not, within Russia, very many mechanisms for allowing them to come and talk to people in the UK or for people in the UK to go and talk to them, there are more mechanisms for some of the other countries we are talking about. That would be the short answer. The second answer would be to do with history and the agreements we have managed to set up with the Russian academies and others to set up these exchange agreements. Thirdly, I would like to say we are in the process of reviewing our entire foreign policy in order to check that we are happy with such different expenditures. Each of these will be peer reviewed, looked at by a properly constituted panel and will have been set up as part of an exchange agreement with the academies as far as I can remember.

(*Mr Cox*) Julia is absolutely right on that, it is partly historical. Of course it was the former Soviet Union, Russia, etc., now it refers to Russia, the Ukraine and other of the republics of the former Soviet Union. That is a huge part of the world. There is an enormous scientific infrastructure in Russia and the Ukraine. Secondly, it is an area of the world where access traditionally has been very difficult and remains difficult for all sorts of practical reasons of language and travel and cost and so on. So the Royal Society's programmes have tended to stress areas where we feel we can make a difference, where our money will make a difference. Because of our close contacts with partners in these countries, particularly

[**Chairman** *Cont*]

Russia and the Ukraine, we are able to facilitate scientific exchange. There are all sorts of major projects that scientists in the UK are interested in pursuing. We have a major project on Lake Baikal in Siberia which is an ecological project looking at what is the largest single freshwater lake in the world. These are reasons why British scientists are interested in going to Russia and why they are interested in having Russian scientists over here. The other thing I would say about Russia is that the calibre of the individual scientists remains extremely high indeed, particularly in theoretical subjects, and the benefit to the UK of collaborating with them is very substantial indeed.

13. Two quick questions. You have a programme with Cuba too, do you not?

(*Mr Cox*) We do.

14. That does not figure on your break down. Is it "and others"? Why not name them? Some of us are proud to be associated with them.

(*Mr Cox*) We do have a programme with Cuba and we have a programme with it in the medical and biological sciences, which is a very vibrant programme. It comes under "other" because the amount of money spent is really quite small but the scientific establishment in Cuba is relatively small.

(*Lord May of Oxford*) We actually have three particular days in the calender, one of which is India Day, one is Japan Day and the third one is Cuba Day.

15. Other organisations have said that they value their independence by not having government money. The corollary of that, of course, is because you have government money you are in our pockets and do as you are told, like every Labour MP does these days according to the press. How would you answer that?

(*Lord May of Oxford*) At the risk of finding some of my American friends reading Hansard let me say it really is a very real thing that one should worry about. The US National Academy of Sciences, which is a wonderful organisation created by Lincoln around 1850 explicitly as an advice giving body for government, has by this time acquired a thing called the National Research Council with about 1,000 staff heavily dependent on a steady flow of money from government to undertake studies of this, that and the other, it publishes a study a day. I feel, as do many of my fellow members in the US Academy, that this on occasion handicaps the NAS from being too critical of the Government in power, so it is not a chimerical feel I would endorse. However, if you look at what we do, essentially all that money is coming from Government but it is coming in a sense in the same way as NERC or the Medical Research Council or the Engineering Physical Sciences Research Council and so on. It is coming as money for us at a much lower overhead because we are using mainly free labour to disburse in the university research fellowship programmes, in our overseas activities that we just touched on briefly, and in that sense I do not see that as a worry at all. It is not compromising our independence. We are taking it to do a particular job and it is a particular job that is audited. On the other hand, among the many other things we do we organise discussion meetings, journals, much of that is with our own money and, in fact, the journals bring in a profit. Then there are the international things that we do but there are also policy studies that we do. For example, recently we have given an independent report with our own money, that is my understanding. The money we spend on policy studies is primarily our own money. We did one on depleted uranium which was quite critical of aspects of the Government. Also we offer responses to Government consultations which are often quite critical, as was the one published on radioactive waste earlier this week. I have gone on at length a bit here, Chairman, because I think it is a very pertinent question. You will be aware that we were asked by the Government to conduct an independent inquiry into infectious diseases of livestock and for the first time, and this is for the first time, we were given the money to conduct that study. We had a thorough discussion with the council before we did that because it was a very thin edge but nonetheless the worry was that it was the thin edge of the wedge. We have undertaken that study on the conditions, first, that we drew up the terms of reference, we decided how we would do it, we put together the committee, we have no further contact with Government and we will publish the report in the next few months subject only to the scrutiny of council, our own internal mechanisms, and nobody in Government will have the slightest ability to influence that even in the most indirect or subtle ways in a manner that could exist were we too heavily dependent for our very core existence not on the throughput of money but on money that paid everyone's salaries. Yes, it is a worry but I do not see it as a worry for the Royal Society at all at the moment although it is something one should always be aware of.

Bob Spink

16. Nevertheless in taking on that inquiry you enabled the Government to avoid having a full public inquiry into that subject. Do you not feel used?

(*Lord May of Oxford*) There are three inquiries, as you know probably better than I do. One is a general thing into rural affairs and one, which I will not comment on, is a backward looking one on lessons to be learned, and ours is an inquiry that is designed to say in the light of current scientific knowledge and in the light of likely future developments in vaccines and other understandings—

17. Let me make it clear before you go on because I am not questioning the validity of the study that you are doing, I am sure it will be an excellent study on its own terms and all the rest of it, but do you not feel politically it enabled the Government to get off the hook?

(*Lord May of Oxford*) No, I do not think so. I am sorry, I am being a bit long winded. In fact, I was just in the middle of a sentence. If you contrast it with a judicial inquiry, first of all it would have been vastly longer. Our focus is narrowly on how better in future to prevent such a thing happening, or if it does how best to handle it. We put together a committee that has 15 people, five of them fellows, the other 10 mainly younger people, it has a farmer, an environmental group representative, consumer representative—

[Bob Spink *Cont*]

18. You are into the detail again.

(*Lord May of Oxford*) We have had wide public consultation to ask people what are the questions you think we should be asking. But then we have a wide range of really expert opinion to look ahead to ask what will be the role of vaccines in the future, what should be the strategy before the next war starts, what are the permanent processes of ongoing review so that this report just does not get shelved like judicial inquiries will. We have been able to do that openly in the sense of consulting people. The most recent progress report was downloaded over 5,000 times from the website, it has engaged people. I do not think it has let the Government off the substantial hook of asking in the light of what we are saying how you should do it, that will have implications, even though our focus is on the future, if there were errors made. It is only part of a troika.

Bob Spink: You mentioned funding and we have mentioned the government funding. You said earlier about a third of your funds come from non-governmental sources. You started that process in 1998, I believe, raising money from non-governmental sources.

Chairman

19. You submitted another document today on operational costs in which you upped it by 2.5 million, so maybe you could explain the finances of it, the public-private funding.

(*Mr Cox*) The Royal Society started in 1660 privately financed and our endowment goes back to—

Bob Spink

20. But you relaunched a fund raising campaign in 1998, you recall that?

(*Mr Cox*) I know it happened, yes, called Project Science.

21. You are now raising about a third of your funds from public sources whereas the other areas get better leverage. Engineering, for instance, get two for one. For every pound of OST money they get two pounds of public funds in. Are you happy with your success rate of one-third at the moment? Do you think that can be improved? Do you think that the two for one leverage that the engineers achieve is a viable target for yourselves and is that a target that you would like to adopt?

(*Mr Cox*) I have got the figure here that the current leverage is for every two pounds that the Government gives us we raise one pound, so it is also two for one but the other way around. However, in addition we looked at leverage and we looked at the way we lever money through various mechanisms and the details are in the document. Currently, according to our records, we leverage five pounds for every pound that the Government gives us. The reason we relaunched our fundraising efforts was because we did indeed want to raise more money from private sources. You will see that the amount of money we now get from Government as a proportion of our total budget is less than it was and we feel that is a good thing. As the President has already said, there is always a danger of having too much money from one particular source so we have tried to ensure that the sources of money we are able to tap into are varied so it is our own resources, we earn money ourselves, particularly from our publications, we raise money from trusts and foundations. We are very fortunate in having been around for a long time so we have an endowment which is topped up from time to time by bequests from fellows and we have a government grant. All those things are elements of the total funding package. The document has tried to bring together all those because we deliberately wanted to give you a picture of not just the government funding and the work that does but of the total funding of the Royal Society and the work that the total funding produces. It is a mixed package. There was no particular reason for 1998, it was a time when we said we need to relaunch our fund raising campaign that had been going on for a number of years and we will probably relaunch it again in the not too distant future.

(*Lord May of Oxford*) May I suggest that Julia might wish to say something. Julia, like our Treasurer, is a Fellow of the Royal Academy of Engineering and of the Royal Society.

(*Professor Higgins*) I think you have to look at what we are spending the money on. On some of the things we are spending the money on there is no realistic hope that we are going to provide double that for what we are doing. Other sources are not going to fund our university research fellows. We have a number of specific scholarships for those but there is not a source of funds that is going to double that particular income.

22. Is that because the engineers are a nearer market?

(*Professor Higgins*) No, they are funding a very, very small number of fellows compared with the number we are funding.

(*Lord May of Oxford*) I would like to say one more thing in this context. In looking at the learned societies you need to recognise you are looking at a real mixture of apples, oranges and other fruit and I would really caution you against making too simple analogies among them. This is something the Brits are very good at. There are a lot of things Brits are pretty poor at but this is one thing Brits are pretty good at. Some of them are essentially professional associations, so the Institute of Physics and the British Ecological Society are roughly comparable. The Royal Academy of Engineering is a wonderful thing but it does not invite too simplistic a comparison with the Royal Society. In fact, the comparison is much less one to one than the US National Academy of Sciences and the National Academy of Engineering. For example, one of our ten sectional committees is engineering and some of the others touch on engineering so it is not surprising that a tenth of our fellows are also fellows of the Royal Academy of Engineering. On the other hand, it does elect 60 people to our 40 people each year from a smaller area and thus it does a very exciting different sort of thing in that it brings together much more industry and the outside world whereas, for all the applied and general candidates as I said, we are somewhat more emphasising the fundamentals of science across the entire spectrum and in a synthesising interdisciplinary way rather than a

[**Bob Spink** *Cont*]
fissive way. We are each wonderful in our different ways but they should not be too much compared one to one.

Chairman

23. Just before I ask Andrew Murrison to come in, in your operating costs do you have a strategy, a policy, using public and/or private in those? Do you just lump it altogether?

(*Mr Cox*) No, we do not lump it altogether, that is how I know exactly how much we spend on administering the parliamentary grant and, therefore, what else is the balance. We are required by OST to account very precisely for the cost of the administering of the Parliamentary grant-in-aid and that is clearly identified in our submission and in our submissions to OST. I should say that is the full cost, there is nothing else. We are not a government body in any sense so we do not benefit from any pension contributions from elsewhere or any shared services or anything like that, that is the full cost of the administration of the parliamentary grant. The balance is, what we pay for from our private funds to run the Royal Society.

Dr Murrison

24. Can I stick with money and just ask you about transparency. We all have websites these days, sometimes they are good things and sometimes they are not, I am sure you have one. I was just wondering whether your accounts are published on your website and, therefore, whether they are easily accessible to the general public?

(*Mr Cox*) I would need to find out whether our accounts are published on the website. I do not know but I will give you an answer separately. Our accounts are published. They are fully audited in the normal way. They comply with all the requirements of accounting practice for charities. I do recommend you visit our website, it gets over two million hits a month which is a figure that completely staggers me, I do not know who these two million people are out there. I genuinely recommend that you do visit it because it contains a huge amount of information about the Royal Society, including all the rules and regulations that relate to us, a list of every single Fellow of the Royal Society, their contact details where they have allowed those to be put up, details of all our reports and all our activities. We use our website very extensively for encouraging applications for all our awards so you will be able to apply to us by getting the application forms from the website. It contains links to subsidiary websites which we have set up which include one on science communication and one on education. We actually give very high priority to our website.

(*Lord May of Oxford*) We have a full-time website manager, which was part of the initiative we took in response to wanting to be more fully engaged with outside issues. We have also got all the contact details not just of the fellows but of all the university research fellows and younger people.

(*Mr Cox*) I should add that our review of the year, which contains an extract from our accounts, is on the website and that gives you a rather better picture of the way we spend our money than the full accounts. The full accounts can be obtained from us if they are not on the website.

25. I think you have probably answered my question. My question really had to do with transparency, whether any inquisitive members of the general public might be able to find out where you get your money from, particularly money from government sources, and where that money goes.

(*Mr Cox*) That is very clear by looking at the bit of the review of the year of where our money comes from and where it goes to.

(*Lord May of Oxford*) Not only can but do. It is not just the two million hits. Our recent reports have had more than 5,000 downloads, more substantial engagement.

Chairman

26. That could be the *Sunday Times* of course.

(*Lord May of Oxford*) That is not 5,000. The two million hits are about a million in the UK and about a million outside the UK.

Dr Murrison

27. I will carry on, if I may, with your accommodation which is really rather splendid, Carlton House Terrace. It is on a 99 year lease, I understand. What I would like to know is whether the Government is committed to paying the rent for the full term of that 99 year lease or not?

(*Mr Cox*) Most recently before we were in Carlton House Terrace we were in Burlington House which was built for learned societies, primarily for the Royal Academy and the Royal Society. In the mid-1960s there was a wish by Government to use that in a slightly different way and also a wish by the Royal Society to be able to bring all its staff together in one place because we had outgrown Burlington House and provide greater facilities for the scientific community. Concurrently HMG had a property on Carlton House Terrace, which was formerly the German Embassy, which they offered back to the German Government when the Control Commission was wound up. The German Government declined the offer and went to Belgrave Square. They were looking around for other people to have these premises, which at that time were occupied by the Foreign Office. Then the Royal Society came into the picture and the agreement between the Royal Society and the Government was in exchange for us giving up our occupancy at Burlington House, which was for us, we would have the rent paid for the 99 year lease on Carlton House Terrace. The additional point is that Carlton House Terrace is not just for the Royal Society, 1,800 meetings a year are held at the Royal Society, we are a facility for the whole of the scientific community. There is additionally a wish to create a science and arts complex associated with Carlton House Terrace, so next door we have the British Academy, underneath we have the ICA, along the road we have the pathologists and materials and metals and, of course, in the middle we have the Turf Club which I suppose brings in the other elements of culture.

Chairman

28. The answer really is yes, the taxpayer is still picking up the tab.

(*Mr Cox*) The answer is that the taxpayer agreed to pick up the tab. It is clear in our submission.

Dr Murrison

29. I am a little bit concerned, you have mentioned all these other organisations, are you suggesting that the Government is essentially providing facilities for the admittedly very laudable outfits that you have described?

(*Mr Cox*) No, I have no knowledge of that.

(*Lord May of Oxford*) If we had managed this better, Charles II offered us what is now the site of the Royal Chelsea Hospital but the people at the time felt it was a bit out of town.

The Committee suspended from 4.56 pm to 5.03 pm for a division in the House.

30. Can I dwell on Carlton House Terrace for a little bit longer and particularly the internal redecoration of it. My understanding is that you have a new lobby. Can you assure the Committee that this has not been funded in any way by the Government?

(*Mr Cox*) Yes.

31. Can you tell me how it was funded?

(*Mr Cox*) It was funded from the Royal Society's private resources.

(*Lord May of Oxford*) May I just ask a follow-up to that. Would you feel that a university falling to bits through years of neglect and under-funding that refurbished part of itself would be out of order in doing so?

32. I make no judgment, I merely asked the question. The final point on this is you clearly occupy prestigious, attractive premises in the middle of London, do you feel that it is an appropriate use of Government funds to be paying the rent for it or not?

(*Mr Cox*) My straight answer is yes. The reason I say that is that the Royal Society is the UK Academy of Sciences, it represents the UK not only in an intellectual sense but in a physical sense as well. It is right, proper and appropriate that the Royal Society should have premises so that it can undertake this representational role. By analogy with countries elsewhere in the world where the premises of the academies are provided by the Governments of those countries, I think it is appropriate that the Royal Society should be housed in order that it can represent British science to the best of its ability.

(*Lord May of Oxford*) If I may just briefly supplement that. I would say if you compared it to the French Academy or the US National Academy of Sciences or the Japanese Academy, it is not that grand. Speaking entirely personally, I would be happier in a place that was slightly less florid and a little bit more with a contemporary image, which is one of the reasons I am quite pleased that we have reconfigured the ground floor to give us more available space and a slightly less antique appearing lobby. I would simply say yes I am happy that public money goes into it because one of the things that remains good about Britain is we have not gone down the road to private affluence and public squalor. The Commonwealth Academy of Sciences should be as well housed as a decent business premise.

Chairman

33. Let me turn quickly to the research fellowships. We understand them because we have talked to you about them and we recognise the prestige associated with them and so on. The point could be made, could it not, that the Research Councils could actually fund these as well and, after all, the Research Councils have a lot of free labour as well? People review papers for nothing, they do not get paid for it, they spend a lot of time chairing meetings and all the rest of it, supervising students and all that stuff and assessing grants. Why should we not just give all the money that you put into the research fellowships into the Research Councils and let them carry on with their post-doctoral fellowship schemes?

(*Lord May of Oxford*) Firstly, they do do that, of course, they do have their own post-doctoral schemes. Each of them in separate ways have them and they fund quite a large amount of post-doctoral schemes. The reason we have this is simply that precise, long-term, up to 10 years renewable and freedom to do what you like where you like, based more on a proposal for a broad programme than a detailed specific thing, sometimes even in response to some directed programme of research, and not confined by particular disciplinary boundaries so that we can easily support somebody who falls between two boundaries is seen to work well.

34. The Research Councils could do that, there is nothing to stop them doing that.

(*Professor Higgins*) I have had experience of both, Chairman. Could I draw an analogy because I think it is very interesting. If you look at the university research fellows of the Royal Society, they form a cohort and they are invited to the Royal Society, they are involved in the activities of the Royal Society, there is a support mechanism for them. To my knowledge, and I have not seen anything like this, none of the Research Councils is either in a position to, nor does it, support those people in terms of developing their careers. They are there, they have the money, that is great, but then they are off on their own. What the Royal Society does, and does very well indeed, is provide a central environment to involve those young people in the development of science and that, to me, is the huge difference and that is why it is a different scheme from the Research Councils' scheme and very observedly different I think.

35. Is that the major difference, do you think?

(*Professor Higgins*) I think there are other, smaller differences. The major difference is that these people are part of a cohort which is demonstrably the best of British science and it is longer term than the Research Councils. None of the Research Councils will go beyond the five years that they initially fund, whereas the Royal Society has up to 10 years, so it makes it quite clear that this is the beginning of a career and allows the fellows to develop their careers into permanent careers.

[**Chairman** *Cont*]

36. The Gareth Roberts' Report indicates the necessity of doing that too within Research Councils.

(*Professor Higgins*) The Research Councils simply do not have the facility that we have for providing that broad support mechanism. In some ways I think it would be nice if we could provide it for the Research Councils' fellows as well. I think that is a group of people who need cherishing.

(*Lord May of Oxford*) I would not under-estimate the added benefit of the fact that of course you can get round the boundaries between the Research Councils but the fact that this is just looking at the whole pool of people unencumbered by restrictions about the areas you are supposed to be commissioning research on.

Mr Harris

37. I want to ask you very briefly about Copus, which I believe a year ago stopped being an acronym and became a word in its own right.

(*Lord May of Oxford*) How unfortunate.

38. What else has changed in the status? I am not quite sure what the Society's relationship is now with Copus.

(*Mr Cox*) Copus was originally a partnership between three organisations: the British Association for the Advancement of Science, the Royal Institution and ourselves. We had a major review of it last year and we reconstituted the council of Copus so that it now includes a much wider range of organisations represented on the council. Previously the council comprised people from those three organisations. It has changed fundamentally in terms of the nature of the council. The major job that Copus does, and it does incredibly well, is it distributes small grants. Something like £400,00 a year is now being distributed by Copus in grants to support science communication.

39. In terms of public understanding, is there not something of an overlap here? Is there an overlap between what the Society does and what Copus does? Is there not a way of streamlining it so that you do not overlap on the same subjects?

(*Lord May of Oxford*) I would say that the answer is essentially no. The new initiative that the Society has launched, again with money provided by the Kohn Foundation in this instance, is the initiative on Science in Society which is related but rather different. Copus was basically, and still is, dialogue but it is more trying to focus in the widest possible sense on understanding what science is about whereas Science in Society is oriented to the scientists and citizens engaging in debates about values in which science itself as such has no particular voice. Copus, on the other hand, when it was created was in a sense the most important game in town, and still is, but over the 20 years that have elapsed since Copus' very success it has spawned lots and lots of other activity in public outreach in science. Personally I think that is great, I think it is a form of creative anarchy that if you travel elsewhere in Europe, to France, to Germany, to Scandinavian countries, to the United States, you do not see. Our Science Week and our British Association Festival Week in September are the envy of the world. There are thousands of individual anarchic events, many badged and funded by Copus, others spawned in the spirit of Copus. Yes, there is lots of overlap among them and I think that is a great problem to have.

40. You may not have this figure to hand but do you know how much of your grant-in-aid is used for public communication of science? Perhaps not so much public relations promoting your own Society but in general science terms.

(*Mr Cox*) The answer directly is £810,000 and that includes the grants that are made to other organisations which are detailed in the submission. It includes some of the work that Copus does. It includes some of our public programme and it includes our educational programme which is a major element of our work.

(*Lord May of Oxford*) You might argue why give it to us to give to somebody else, as some of it is, and the answer again is just cost efficiencies, you have the one accounting officer rather than having to duplicate bureaucracy.

Chairman

41. How much of the money you have just talked about is work in-house, as it were, rather than giving it to other groups to do that work?

(*Mr Cox*) I cannot tell you that figure offhand.

42. Perhaps you can provide it.

(*Lord May of Oxford*) Given that it is 810 and 400 is in the small grant and others are given away, it is essentially all out of house.

43. Let us confirm that.

(*Mr Cox*) I will. Could I just pick up a little point that was made there. Our own PR and press activities are not funded from this source, they are funded privately. I just want to make that clear.

Mr McWalter

44. How much effort do you put in to trying to convince the wider public that science is actually engaged in an honourable even an ethical activity? How much expertise in ethics do you have available to you in order to be able to make that case with ease?

(*Lord May of Oxford*) Let me give you a for example rather than an abstraction. In the debate on stem cell research—

45. I was after an abstraction actually.

(*Lord May of Oxford*) Good. I will give you an abstraction.

46. Thank you.

(*Lord May of Oxford*) The answer is quite a bit and we do it through organised activities, we do it through the setting up and functioning of the science in the Science in Society Committee and we do it through ad hoc activities such as the one we have put together in connection with embryonic stem cell research. It would be touched upon also, of course, in some of our specific inquiries into a particular subject. We are very conscious of it.

[Mr McWalter *Cont*]

47. In looking at the list of people who are involved in this, we have got the Science in Society Committee, I do not see, for instance, any moral philosophers in that list.

(*Lord May of Oxford*) Is Ian Kennedy not on it?

48. Ian Kennedy is on it, yes I suppose him.

(*Lord May of Oxford*) I think he would take exception to your characterisation.

49. He would not be regarded as a moral philosopher but as a bio-ethicist.

(*Lord May of Oxford*) A professional ethicist.

Dr Murrison

50. Can I return to a bit of benchmarking. Government gives grants to Research Councils, it gives grants to organisations like your own also. I wondered if you had ever thought to compare how cost effective your research fellowships are compared with, say, the cost effectiveness of the Medical Research Council or other Research Councils? Can you comment on that?

(*Lord May of Oxford*) Certainly we could. How you calculate indirect costs—and this is a subject which anybody who has spent most of their life in America knows much more about than the typical person who has spent their life doing these things in Britain—there is a lot of arbitrariness in it. If you calculate our total administrative costs for all programmes we administer they are six per cent and that is a low figure, particularly low when it is honestly the total administrative cost without fudging stuff. I believe that is comparable with and if anything slightly lower than the MRC figure, for example, but that is also, by international comparisons itself a low figure. Under the workings of successive director-generals of the Research Councils, straying outside our remit, a good deal of efficiency scrutiny has gone into these things.

(*Mr Cox*) Could I add to that? We carry out regular reviews of our programmes and we try to assess how successful they have been. We gave you deliberately in the appendices two examples of reviews we have carried out so you have an idea of the sort of review we are undertaking to make sure that the programmes are fulfilling the objectives we set for them. By any measure they are being remarkably successful. If you look at the URF programme, which is designed to ensure that the UK remains fully competitive in the supply of personnel to the science base, the URF programme is having a very dramatic effect in doing so and the Dorothy Hodgkin programme, where we are trying to ensure that we do not lose the best women for science, again all the indications are that programme is extremely successful. If you take the industrial fellowship programme, which is a nice one to look at because it is much smaller, the numbers of patents, the numbers of new products, the numbers of successful collaborations are really very substantial indeed.

51. Can I ask you whether Government has asked you the question that I have just put to you or not? I would expect Government to be focused very heavily upon where they can get the best value for money for the money they put into research organisations and I would expect Government to have asked the question that I have just asked you. Have you had contact from ministers on this or not?

(*Mr Cox*) We have not had from ministers but from officials, yes, we have regular contact with officials about the nature of our programmes, the cost effectiveness of our programmes and the outputs of our programmes. That is a regular discussion between us.

(*Lord May of Oxford*) In this sense we have exactly the same relationship with the Office of Science and Technology as—

(*Mr Cox*)—as the other Research Councils.

(*Lord May of Oxford*) I do think it is an Office that is run well.

Mr Heath

52. I have been mulling over a reply given earlier by Professor Higgins that the Society could extend its mentoring or pastoral roles to Research Councils?

(*Professor Higgins*) I did not say we could, personally I would like to see us do so.

53. That is not official policy, as it were?

(*Professor Higgins*) Not at the moment, no. I am very interested, we all are, in the next generation of scientists and as Foreign Secretary—I have only just taken over—one of the things I am particularly interested in is furthering exchanges and interactions between cohorts of our young scientists and cohorts of scientists overseas. It would seem to me a natural to include within those sorts of exchanges the research council fellows as well as our own fellows. I am answering something that I have not designed yet.

54. No-one would see that as a dilution.

(*Professor Higgins*) No.

(*Lord May of Oxford*) No.

(*Professor Higgins*) We see those fellows as comparable intellectually as ours. In fact very often I have seen people who often, because of the timing, have got one from each and then they have to decide which one they are going to take.

55. Can I move on from that to something we were beginning to touch on, the Dorothy Hodgkin scholarships. You know the criticism that there are not enough women involved in science at the highest level but also within the Society and the fact that the proportion of female fellows, even from your own figures you have given us, compares badly perhaps with comparable societies overseas. I think it is India and France are the only ones which come out worse.

(*Professor Higgins*) I am not sure that France has more than us.

56. No, they are worse.

(*Professor Higgins*) Oh, I am sorry.

57. India and France if possible are even worse.

(*Professor Higgins*) Can I answer on about three different levels on this.

58. Okay.

(*Professor Higgins*) I think it is a mistake to simply look at the top level of any group because you have to ask what is the pool from which you are drawing the people you are electing. The people who are being elected as fellows by the Royal Society are people who have successful careers in science already so you are reflecting, in a sense, what has happened over the last couple of decades and therefore differences between countries. One of the things also you have to be very

[**Mr Heath** *Cont*]
careful about is academies in different countries include different groups of scientists, I am becoming very aware of that as Foreign Secretary. They may or may not include the social sciences and that distinctly changes the balance of whether you get women or not. The comparability is tricky. In fact there are relatively few glaring examples on that list of people who do a great deal better than us, except Turkey is one of the ones which does a great deal better. Looking at the top level and asking where are the fellows coming from, you have to say what is the pool like. Then it is difficult to measure something like that so you say "Well I have to look at some surrogate measures. How many professors are there in those subjects in English and British universities?" It is a comparable number to our percentage so the pool from which we are drawing in the universities looks comparable. The people we would elect would probably be at a senior level in the other learned societies, although they do not have to be elected. I was horrified to note that the Institute of Physics only has 1.5 per cent women and the Royal Society of Chemistry has 3 per cent. That is not because they are excluding them, it is just that women are not there to be fellows.

59. Let us accept for a moment that you are electing a proportionate number. Are you getting the nominations in proportionate numbers from the base from the number of women who hold senior science positions?

(*Professor Higgins*) We are, yes, as far as we can tell we are.

60. You monitor that?

(*Professor Higgins*) Yes, we can count them up and see what the proportion is. The figures are that actually the number of women who have been nominated has been going up over recent years and it is now around about 8 or 9 per cent, I think, which is working ahead of the pool which is very good. The number who are being elected is proportionate to that, it is perhaps slightly ahead of the number who have been nominated.

(*Lord May of Oxford*) Once women get into the candidate pool they do slightly better than men, though not statistically significantly. Part of the task of the review committee is to make sure that there are no unconscious biases or people being overlooked, not just emerging disciplines but for one reason or another. Be that as it may, for the last eight years, including what will happen tomorrow, we have been electing women at the rate of about 8 per cent of the elections. You can see while that is good compared to the pool and so on, it is going to take us a long time to fix it. We worry about it hugely because if you look down to the younger people, a third and more of that cohort are women and we want them to be able to see examples of success. We worry particularly too about the problem of the few women, that in wanting to show them as models we are disadvantaging their careers. I assure you it is not for lack of thought or worry and it is a problem we share with other countries. The differences between us and comparable places are small and we find other handicaps. I speak from long personal experience of Australia and the United States where there is much better child care and there are tax breaks for working couples, neither of which we have. There are things we could do to make it easier.

61. One of the things you do have is the Dorothy Hodgkin Scholarships. They are open to men and women, hugely oversubscribed by women in comparison, 90 per cent as I understand it. Does that mean that women are not applying for other forms of scholarship?

(*Professor Higgins*) No. Actually I have just got a very interesting statistic that I want to share with you. We are just in the process of finalising the choice of the next bunch of university research fellows and I was absolutely delighted to find that just under 50 per cent of those in the physical sciences this time round are going to be women and I think that is a real break through. I do not know what the biological sciences is because they were still working on it when I left, they were looking at the final list. It is very encouraging that women are coming into the other fellowships as well. It is an extraordinary effect that dramatically they are coming in through Dorothy Hodgkin, they really feel empowered to do that.

62. Some of the reasons for that obviously are because they address some of the issues, some of the impediments, so why not address those issues in all of the scholarships that you offer? Why is there a ghettoisation, as it were?

(*Professor Higgins*) It is very interesting. If you look at the conditions for the other university research fellowships, maternity leave, support for going to conferences, it is all there. It is partly age. We actually focus the Dorothy Hodgkin's because it was believed, and I was not part of the management team at the time but I support this, that we were losing women at a very early age after the PhD, so the Dorothy Hodgkin's are focused on a younger age group, people coming out of their PhDs, whereas the university research fellows tend to have done one or two post-docs before they get there. It is marketing. It is a quite extraordinary piece of marketing and it has been brilliantly successful.

63. You are Chair of the Athena Project as well?

(*Professor Higgins*) Yes.

64. How is the Royal Society involved in that? Do you get some financial support?

(*Professor Higgins*) They were completely separate when they began because Athena came out of what was then the CVCP, so part of the connection is me, but over the last two or three years the Royal Society in a number of ways has supported Athena by giving us premises and by giving us financial support for specific meetings. They are going to be supporting five dissemination conferences over the next few years. I say "they" because I have put on my Athena hat, it is slightly schizophrenic. There is a request for support for some of the activities of Athena in the future Comprehensive Spending Review submission.

(*Lord May of Oxford*) Currently it is out of our own money.

(*Professor Higgins*) Currently. It is a great deal of moral support, provision of facilities and actually some financial support out of the Society's own money. I think the Society sees it as an absolute core necessity. The Society can support the young people starting their careers, what Athena does is really focus on trying to keep them in there.

(*Lord May of Oxford*) Chairman, could I just use that to mention that one of our proposals that we have asked for some more money for in the next Spending

[**Mr Heath** *Cont*]

Review—this has come out of consultation—is a new category of relocation fellowships that stems from the feeling that often when a couple move because one of them got a job the other, more commonly the woman than the man, is then left in limbo for a bit. We want to have a programme—

65. I read that in your submission.

(*Lord May of Oxford*)—that will provide funds to bridge and keep that person going. As you will see, nearly all the new initiatives that I hope we would get your endorsement of, because I think all of them speak to shared concerns, are nearly all oriented one way or another to diversifying our reach and oriented to younger people. There is the minor thing about Athena, there are the industrial fellows, there are the international brain gain fellowships, and above all what we are trying to do is enlarge this reach that not just gives them money but thinks of imaginative ways to keep people in the system against the odds.

66. One more question, if I may. We have talked about diversity but the one area you have not mentioned in your submission or today either is ethnic minority support. It seems to be something that is invisible to the Society at the moment. I understand you do not monitor fellows or perhaps even your own staffing or research fellowships.

(*Professor Higgins*) We do, of course, know how many Indian fellows we have because they are part of the Commonwealth. We actually do rather well on the numbers of Indians.

67. I do not think we are so interested in that but within the UK population. You do not feel this is a responsibility?

(*Lord May of Oxford*) We are certainly very aware of it in our own staff and I think we have a pretty good record in that regard.

68. You know that, do you?

(*Lord May of Oxford*) I know that. I can tell you that. I could tell you the statistics and particular people. It is not that we are doing it through any sense of obligation, as it were, these people are all just ace people, they just happen to be Malaysian, Indian and other such things. I would not dismiss too lightly the character that is given to the Society by the fact that it is the Commonwealth Society. We elected our first Indian fellow in 1841 and we have had a long stream since. Of the 26 Indian fellows only 15 actually live in India, the others are in this country, in Australia. The wonderful thing about science, as I am inclined to say at too great a length, is my own research group comes from nine countries and four continents and that is 12 people. My own life has been lived in different countries. I have difficulty thinking of people in categories because my friends and colleagues are friends and colleagues in science. It is the transcendent thing, it is the one ray of hope in Palestine and Israel.

Mr Heath: In terms of an internationalist view that is undoubtedly right but when we are talking about encouraging people within this country to pursue scientific careers that is a rather different matter.

Chairman: It is the British ethnic issue that we are worried about.

Mr Heath

69. You can be as internationalist as you like and not do anything to actually bring people into science and encourage them through their careers and I think that is something that this Committee is concerned about and perhaps the Society must be as well.

(*Lord May of Oxford*) I thoroughly agree. As we look down into schools in so far as on occasion we have events where we bring together schools and different places we try and make a deliberate effort to make sure that those are indeed very consciously multi-ethnic meetings. I could give you anecdotal chapter and verse, for example, on a lecture that I gave at the beginning of—

Chairman: Spare us.

Mr Heath: I am grateful.

Chairman

70. We would really like your monitoring policy if that is available because we will be doing other work in this area, I am sure.

(*Lord May of Oxford*) For the staff we can give it to you but for the fellowship we do not do it.

71. And research fellows too, do you have a monitoring policy for research fellows in this country?

(*Professor Higgins*) No.[1]

72. Is there a reason for that?

(*Professor Higgins*) We simply go for the best. There is no quota for women, there is no quota for anything, it is merely we go for the best.

73. We have put you under pressure for over the time and I know there are others waiting in the wings to come in. Thank you very much for sharing this session with us and for giving us very frank and straight answers, long sometimes but there you go, they are all recorded. Thank you very much indeed for coming. We will give you the report.

(*Lord May of Oxford*) Could I give you the first paragraph of the last letter Max Perutz wrote to me.

74. Yes, I have seen it. You can send it again if you want.

(*Lord May of Oxford*) Max Perutz said "I am about to die and I wanted to write to you to let you know what the Society meant to me. All through my life people have asked me am I Austrian? am I British?; perhaps I am a jew and I have been evasive because what I want to say is "I am a Fellow of the Royal Society'." He said it is the world's most active academy.

Chairman: I do not know how they got eight *Desert Island Discs* out of you. Thank you very much indeed.

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[1] *Note by Witness:* We do not monitor research fellows. See supplementary evidence.

Examination of Witnesses

SIR ALEC BROERS, President, PROFESSOR ANN DOWLING, Vice President and MR JON BURCH, Executive Secretary, Royal Academy of Engineering, examined.

Chairman

75. Sir Alec, may I welcome you and your team here. You have met this Committee before in the previous Parliament. It is great to have you back and can I say thank you for extending that invitation to a lunch time meeting with your Academy. That was very welcome and has helped fill us in on lots of the issues. You may like a minute to introduce your team to the Committee and for the record. Welcome.

(*Sir Alec Broers*) Thank you, Chairman. It is a privilege to be back here. As most people know, I am President of the Royal Academy of Engineering and I have accompanying me today Professor Ann Dowling who is a Vice President of the Academy and also a Professor of Mechanical Engineering at Cambridge, and Mr Jon Burch who is the Chief Executive of the Academy. May I just say two things at the very beginning please, Chairman. I think the Academy has reported to you in detail in response to your questions and I hope that our submission presents our wide ranging activities in a clear and persuasive manner. Certainly I am not going to summarise those activities but we do look forward to answering your questions. From your visit to the Academy in March I realise that you understand, as we do, that the output of the country's creative engineers is crucial to the competitiveness of the country and the nation as a whole and the qualify of the life of all of its people. To contribute to society today we have to reach the frontiers of technology and to do this requires engineers who have a full understanding of the science of their subjects and go on beyond that to understand the practicalities and the economics of their subjects, then understand what their competitors are doing and what their competing technologies are doing. This is a high mountain to climb, very few are able to do it or have the ability. We like to think we have gathered those people in the UK who have achieved most in that endeavour into the Academy and that is why we think the Academy is a very valuable body.

76. Thank you very much. We appreciate those sentiments too and understand why science is so important in our nation today. Can I just lob you the easy one perhaps at the beginning. Similar to the Royal Society we talked about elitism, and we can argue all day about that, but you get £5 million from the Government, something of that order. Why do you think that is valuable and why should the Government, the taxpayer inevitably, give you that money? What do they see for it?

(*Sir Alec Broers*) Because it enables that group I have just described to engage in a broad range of activities that I do not think it would have without that vital seed funding that we get from our grant in aid. As we have laid out in our report to you, we manage to lever that money in most instances by two to one, at least. That underlying funding—if you look at the way we spend our money—I think you will find is quite essential in mounting programmes that we can encourage people to add to.

77. It has been argued by some other societies who have written to us that by taking government money your independence is lost somewhat. We would not go as far as to call you cronies of course—they call us that—it might look like you might lose some of your independence and critical faculties at government because you are tied to them by this grant, they might in a bad moment take away it from you, for example.

(*Sir Alec Broers*) I do not agree with you, Chairman, I think we would not be before this Select Committee if we did not receive funding perhaps. We want to be part of the decision making body of this country which includes Government. We appreciate being a part of the government system and being paid partly by Government. We think we deliver very good value for the money we get and we enjoy being part of that whole process.

78. Why should you get less money than the Royal Society? You are doing very similar things and have similar aims and ambitions.

(*Sir Alec Broers*) We are relatively young, we are quite ambitious, Chairman.

79. You are on Child Benefit, are you?

(*Sir Alec Broers*) We are only 25 years old so we are on our way, shall we say. We do realise that one of our missions is working with industry and with business. That is what engineers like to do. Engineers like to take their ideas and see them used for the benefit of mankind. If we are working with industry and business we do not see why they should not help pay. I think perhaps we are closer to the coalface than the Royal Society.

Bob Spink

80. Do you think that if you got more money this country might have a better record in getting invention to the market place?

(*Sir Alec Broers*) I would like to think that, yes, because a lot of our programmes are designed to help that process.

Chairman

81. Have you ever been on your knees asking for more money?

(*Sir Alec Broers*) I am always on my knees. I normally have a little tin I use.

82. Cambridge University is having a hard time I know.

(*Sir Alec Broers*) I am very new to the Academy. I think the Academy has talked closely to the OST all along, and certainly my predecessor, Sir Den Davies, was active in doing what he could to increase our funding.

83. Accountability to the public. How do you look at that in general terms? What is the attitude of the Academy to accountability to the public, not just financially?

[Chairman *Cont*]

(*Sir Alec Broers*) We want to be very visible to the public, Chairman. We want to influence the public. We like to make sure the public has a clear understanding of what is technically correct, and what is correct from an engineering point of view in various programmes. We would like the public to understand also the importance of engineering and technology. Our attitude towards the public is to communicate with them whenever we can.

Bob Spink

84. Let us get down to the nitty gritty now. The Royal Academy of Engineering runs several fellowships. Could you describe to us the peer review process for those fellowships?

(*Sir Alec Broers*) The people who secure research fellowships are considered by panels of fellows themselves. Do you want to expand on that, Ann?

(*Professor Dowling*) Do you mean research fellowships?

85. The panel does not include people who are not members of the RAE?

(*Sir Alec Broers*) No.

86. It is just your own members?

(*Sir Alec Broers*) Yes.

87. You do not go outside of that?

(*Sir Alec Broers*) No.

Bob Spink: Do you think that is a weakness?

Chairman

88. It is research fellowships we are interested in.

(*Mr Burch*) Research fellowships, is a term which, in the Academy, could cover personal research chairs, senior research fellowships and post-doctoral research fellowships. Each begins with a proposal being received by the Academy. Our reaction is led by a fellow designated "Lead Assessor" who looks at the candidate, the university and the company where applicable. The Lead Assessor convenes and seeks peer reviews from another three Fellows totally independent of the company, the applicant and the university so they do not have an axe to grind there. Formal interviews then follow to ensure that would be post-holders are deemed appointable by all the sponsoring bodies. A final thing is that once a position has been agreed and tied up the Academy appoints, again, an independent Fellow to act as a permanent mentor to the chair or fellowship to provide an extra network, to receive annual reports and, if necessary, to cut off funding if it is not working or to recommend the cessation of funding.

Bob Spink

89. How does the cost efficiency of your fellowships compare with those run by the Research Councils?

(*Sir Alec Broers*) I would imagine they are pretty good but I will turn to Jon for that.

(*Mr Burch*) We like to think that they are virtually parallel. We get a very large number of very high quality applicants particularly for post-doctoral research fellowships. We had 122 applicants for five places last year and all of very high quality. It was difficult to whittle them down to five. We talk a lot to the Engineering and Physical Sciences Research Council and for some of their comparable engineering-related schemes they do not have a large number of that quality of applicants. One can try and put whatever interpretation one likes on that but I do believe, and it has certainly been reported back, that having a Fellow as a mentor all the time to get to know is seen as very, very important by the holders of our various chairs and fellowships.

(*Professor Dowling*) Could I comment on that because I am on the Council of EPSRC as well as being involved in the Royal Academy of Engineering so I see it a bit from both sides. EPSRC does find it difficult to encourage applications from engineers, particularly for the Advanced Fellowships. In some ways engineers seem to trust that the Academy will review them among peers of engineers whereas in EPSRC the engineers are in competition with the pure scientists. We expect a lot of engineers, especially academic engineers. The work has to be relevant as well as being fundamental science and far reaching. When you look at references for engineers there is often "yes, but", "this is fundamental stuff but is it relevant?" When you have engineers in direct comparison with pure scientists, the pure scientists' references are always outstanding. Everyone is going to be a Nobel Prize winner in two years' time. The Academy does attract applications because engineers believe that they will be judged by other engineers and get a fair hearing and EPSRC struggle with this and are working with the Academy because of that.

90. That is very helpful, thank you for that. Why should the OST put money into your fellowships rather than putting their cash into the Research Councils' schemes?

(*Sir Alec Broers*) I think Professor Dowling has helped on that. The quality of applicant we can get is very high indeed. Because of our network of industrial fellows and our visiting professors in industry we have a lot of fingers out there into industry sponsored research which very often attracts the very brightest of the students.

Bob Spink: Your answers have been very clear and persuasive, thank you.

Dr Murrison

91. We heard a quite telling comment from Lord May earlier about private affluence and public squalor which I thought was interesting because he was bemoaning the possibility that there may be public squalor in the Royal Society. The Royal Society, of course, is not a public body and yours is even less so, if I may suggest, because your funding from Government is rather less than that of the Royal Society. Therefore, I think we need to go a little easier on you because it seems to me that our remit is to establish that government money is being spent wisely. With that in mind, I wonder if you could give us a figure for the cost efficiency of your fellowship schemes?

(*Sir Alec Broers*) Can you do that, Jon?

(*Mr Burch*) With difficulty.

92. Is that something you could send?

[**Dr Murrison** *Cont*]

(*Mr Burch*) Yes.

(*Sir Alec Broers*) I think we should send that to you. We have had a break down of the overhead costs but I do not think we have singled out the research fellowships.

(*Mr Burch*) We do within our management plan which is submitted every year to the Office of Science and Technology.

(*Sir Alec Broers*) We will send that to you.

(*Mr Burch*) We break it down into internal and external spend on each of the schemes. We can certainly provide that.

Chairman: Thank you.

Dr Murrison

93. If I could just touch upon fellowships. I do not want to dwell too much on this because the way that you elect your fellows is your business and not ours in contrast to funding. However, I wonder if you could comment on the difference in the number of Fellows that you have, I think 1,270 is the figure I have written here against 1,203 for the Royal Society. I appreciate your two organisations are not directly comparable or comparable in any way but why do you have more than the Royal Society?

(*Sir Alec Broers*) We have as many as we think fulfil the criteria, as it were, and our numbers have grown to that point. We cover a very, very broad range of technologies. I understand that the Royal Society does as well and, of course, many of us are members of both academies but we feel there is a need. We cover everything from biotechnology to pure computer software to civil engineering; there is an incredible range, particularly now with the increase in the medical area where engineering is making more and more of an impact. We have this very broad spectrum and to have representation from all of those areas we have found this is the fellowship number that we need.

94. Is it a representative function? That is an interesting word. I think really what I am asking is what are your criteria for election to fellowship? Do you take representative bits from various disciplines within engineering?

(*Sir Alec Broers*) We have committees that are focused on specific areas but they do not have absolute numbers. Do you want to describe the scheme, Jon?

(*Mr Burch*) All fellows are asked to nominate and we also write to Vice Chancellors, the heads of all the institutions, asking for nominations. I write once a year. We were very conscious two years ago that whilst we were well represented in certain areas that you would expect, such as certain universities, certain companies, such as Rolls-Royce, we recognised that we were under-represented in certain areas, particularly small and medium sized enterprises, that we just did not know what was going on in there. So a small group, a proactive group, within the fellowship was established with the specific remit of looking at areas where we did not know we were under-represented, if I can put it that way. They used all sorts of mechanisms, R&D score boards, the FTSE 500, going out and talking to people in SMEs, and it is interesting to note that eight of the 49 fellows up for election at the Annual General Meeting this year have come from that group. We want to be everywhere in every engineering discipline. If we are going to be able to say to Government "we can offer you a unique, multi disciplinary response to engineering problems", we have got to be multi disciplinary.

95. On the election of Officers and Council, I understand you are consulting the Electoral Society at the moment. Can you tell me what involvement you have had with the Electoral Reform Society?

(*Sir Alec Broers*) I will introduce this. Both my predecessor and myself were very keen to make our elections to Council, etc., more transparent, to use the modern word. That is what we have decided to do as a fellowship and Jon has been talking specifically to the Electoral Society.

(*Mr Burch*) The Electoral Reform Society has come up with a proposal starting with full postal votes on election to council and then working out into a single transferable vote scheme to put through before the AGM. A final decision on the way forward will be taken at an AGM. on the Ist October. They are going to run that for us. At the moment we are putting in hand with the solicitors the changes to the Charter and the Statutes to make that feasible and allowable. We hope to call an Extraordinary General Meeting on 1 October to vote that through. I am confident it will go through.

96. Have you considered using a similar thing for the election of Fellows?

(*Mr Burch*) Not so far.

97. Would it be something that might appeal to you or not?

(*Sir Alec Broers*) I think it would be very difficult to manage on the scale that we would want to operate that.

(*Professor Dowling*) It would also discriminate against industrialists in SMEs which is something the Academy has taken pains not to do.

98. This brings me on to my next point and that is clearly many engineers have made great achievements in industry, indeed they probably formed the basis of prosperity in this country during the last century and the one before that. I wonder how many of your fellows have a background in the private sector rather than in academia? Do you have those figures to hand?

(*Mr Burch*) We have got about 47 per cent Fellows from academia, about 45 per cent from industry and the remainder Government and other areas. We believe it is a strength that we have that split of industry and academia and we also have the ability to pull the two together.

99. Do you think the balance is about right?

(*Sir Alec Broers*) I think we are always looking in industry more intensely than we are in academia because in academia it is easier to meet the criteria that are most easy to observe and measure, which is publications. We try to look hard at industry. A point I would make is that I would say almost all of our academic fellows will have an involvement with industry. Many of them will be spending part of their time in a company if they have not started themselves. It is a back and forth process. I do not

[Dr Murrison *Cont*]
think I am unique in the Academy in having spent the first 20 years of my career in industry before becoming an academic.

100. Finally, you have been really quite successful in getting private finance or non-governmental financing for the Royal Academy of Engineering. What lessons do you think you can teach the Royal Society?

(*Sir Alec Broers*) I would never dare to try to do that.

Dr Murrison: This is your opportunity.

Chairman

101. Just because they are sitting behind you.

(*Sir Alec Broers*) I would never dare to do that and I am very proud of the fact that I am a Fellow of the Royal Society. I think we work well together and I see these different organisations being, as it were, overlapping circles. I do not know exactly the number but I think about 10 per cent of the Royal Society are engineers.

(*Mr Burch*) The number is 90 are Fellows of both.

(*Sir Alec Broers*) 90 is the number, that is the individual number but I am talking about 10 per cent of the fellowship. If you look at our membership you find us overlapped by the institutions as well. We represent, as it were, a smallish percentage of each of the institutions' fellows.

Dr Murrison

102. The serious point is clearly you have been very successful in attracting non-governmental money whereas the Royal Society has been less so. Whilst I accept your two organisations are very different, nevertheless as a funder, Government, looking at the two comparing and contrasting one would say one has been successful, the other one has been less successful and why is that, do you think?

(*Sir Alec Broers*) I would not say that because I think our mission is very much to overlap with industry, many of our engineers are not pure researchers, they are development engineers. They are people who have, for example, actually delivered the Trent engine; they are people who have delivered many of the other engineering aspects of this country and they are people who build civil engineering projects all over the world. These are very much development and practising engineers. The Royal Society's membership I think is primarily involved in research so you would not expect it, perhaps, to have the same involvement with industrial funding.

103. So it is the fact you are close to the coal face?

(*Sir Alec Broers*) Yes.

Mr Harris

104. You mentioned earlier, Sir Alec, about the number of fellows, only 1,270 met the criteria and only 15 of them are women, just over 1 per cent. I think one recognises the fact there are even fewer engineers who are women than there are scientists. The Royal Society, for instance, has set up the Dorothy Hodgkin Fellowship as an attempt to encourage more women. Have you contemplated similar schemes?

(*Sir Alec Broers*) We are contemplating all that we can do. At the moment we are focusing on our educational schemes very heavily but on all of our schemes as well. While we admit, of course—because you can see the numbers—that we are not doing well at all at the moment, we are not doing very much worse than a lot of others.If you look at our various programmes, our Best educational schemes—which are several if you read our report—I think there are about 25 per cent women there. Our graduate programmes similarly: four of our last appointees then in fact were women. Our post-doctoral scheme is 20 per cent overall but our last entry was at 40 per cent. There is this glimmer of hope with the incomers but I agree with Lord May, I heard him say similar things, it will take a long time to fix the whole programme but at the entry point I think there is a glimmer.

105. It is a glimmer. When I saw the figure of 15 I thought it was a typographical error, I thought there was a zero missing. You mentioned the academic programmes that you run, and you mentioned the figure of 25 per cent. Why has that not translated into a similar figure for graduates and under-graduates?

(*Sir Alec Broers*) They are coming through. I have not watched the numbers for many years. I do not know whether, Jon, you can help there?

(*Mr Burch*) Of the people on our schemes, the 25 per cent who are female do tend to go on to university and graduate. What we have to do then is to continue the scheme to encourage them to stay in engineering, whatever that is, as a career. We have started a full monitoring programme now of what the success rate is. It is quite difficult for people on the schemes because they might have gone on and done engineering anyway and just being on the scheme is an extra fillip or boost. We have got quite a lot of statistics now which our major funder for that education programme has asked for.

106. On a similar vein, in terms of ethnic minority participation, do you recognise that you have a responsibility to encourage members of the ethnic minorities into the profession? I understand you do not have monitoring processes for fellows but do you have a monitoring process for staff? The Royal Society I think said they did not.

(*Sir Alec Broers*) I think our staff are small enough in numbers that I am sure our Chief Executive knows what the ethnic distribution is.

(*Mr Burch*) I can give you their names. Yes, we do, it is totally "equal opportunity" for staff. We have never had a complaint about racial discrimination or anything like that go through to a tribunal or anything like that. On the education schemes, yes we do have some ethnic minority monitoring. For instance, on the Engineering Education Scheme in England this year 15 per cent—you are talking about 4,500 applicants—are from an ethnic minority background. If you look at the Head Start programme, which is again over 800 students, again 15 per cent are from ethnic minority backgrounds.

107. Of applicants?

(*Mr Burch*) No, of people on the schemes.

Chairman

108. Could you send us your monitoring programme please?

(*Mr Burch*) Yes.

109. For any group.

(*Mr Burch*) I have just got those statistics actually, we have picked them up.

110. If you have a monitoring policy that would be useful to see. There is a law in the land about monitoring policy.

(*Mr Burch*) I appreciate that. We can send you certainly figures for the staff but I can find out exactly how the schemes got those 15 per cent figures.

Mr Heath

111. One of the great joys of being on this Committee or speaking about science in the House is that you get a great number of invitations every week to attend various things and at least half of them come from different engineering institutions of one sort or another with the result you walk across Parliament Square not quite sure to which institute you are going. Is it in the interests of the wider profession to have 36 different professional bodies? If it is not, what is happening to try to improve matters?

(*Sir Alec Broers*) You will be familiar with the new efforts with the ETB—Engineering Technology Board—which is trying to take—

112. That makes 37, does it not.

(*Sir Alec Broers*)—a broad look, even more than those professions. Engineers appear all over the place and frequently they do not have engineering written on their foreheads. I do not see any real harm in it. If an Institution has a fellowship that meets and discusses their own subject and benefits from that mutual exchange then they can be like that. I do not think myself—and I am not really speaking for the Academy here—that it matters that they are separate. I think we have a very important role, however, to bring the best of all those institutions into a containable body. We have talked about its size; it is not easy to keep it contained. I think that interdisciplinary discussions are terribly important today. I think all of the classic boundaries are breaking down and that is where perhaps the institutions have to look very carefully because it is very difficult to see where some of these subjects begin and some of these subjects end and the British Computer Society and the IEE and others are very close and overlap.

113. To a layman there is an obvious argument for rationalisation within the professions. You do not see it that way.

(*Sir Alec Broers*) I do not know. Ann, you are a mechanical engineer, would you like to say something?

(*Professor Dowling*) I am an aeronautical engineer, also. Yes, individuals probably belong to several institutions because we have common interests with them. I think Sir Alec is right that there is a role for both. You need organisations—and the Academy is one—that does try and get this integration across engineering but there is a real need to have specialist meetings and specialist views. If you did have them all together they would only split into some specialist groups. As long as one clearly understands—and perhaps the engineering profession has not in the past been clear about putting interactions across—that they do have different remits.

Chairman: Yes. I warn you that a few years ago the cancer charities sat in front of us and told us that Omo and Daz did not mix. You can see what has happened to CRC and ICRF now, it is a great benefit.

Mr Heath

114. I think we have established that engineers are naturally vociferous anyway. Let us leave that.

(*Sir Alec Broers*) Sorry to interrupt. If I can answer the Chairman a little. I agree with you in the cancer, I am involved in my other job in setting up a very large lab but the institutions are not research laboratories. If they were then I think there would be benefit in bringing them together. There might be benefit in having more joint meetings. I think, as Professor Dowling has said, they are going to pull into their specialities even if you have them under one heading.

115. Okay. Let us look at the bodies which try to bring the various branches together. You say in your submission to us that "some commentators remain uncertain about how the Royal Academy of Engineering relates to the. . . new Engineering and Technology Board". Well, I am one of those commentators, I am not clear how you relate. Could you explain a little bit further how you see your role as distinct from the Engineering and Technology Board?

(*Sir Alec Broers*) Let me start and then Jon can say more about the mechanics of it. Our role, I think I have said several times and we have been discussing that, is to bring together an-inter-disciplinary group of experts so they can discuss together the issues of engineering in this country and be advocates for it. The ETB is looking at engineering as a whole and it is trying to bring all those 36 institutions and even move beyond that and try and make sure that moving between the different levels of engineering is co-ordinated over the entire engineering community. Jon, would you like to comment?

(*Mr Burch*) I totally agree with that. Yes, we represent the highest achieving engineers in all disciplines. But industry, as well as having high engineers-chartered engineers if you like- requires incorporated engineers, it requires technician engineers, it requires all sorts of people who could be called engineers who probably do not belong to institutions and certainly do not belong to the Academy. The ETB's remit was to try and represent what was called The universe of engineering when the Academy wrote the report for it. How are we going to work together? The Chief Executive has only been in post for three weeks, I went and called on him last week, and the President, Sir Peter Williams, is also a Fellow of the Royal Academy.

(*Sir Alec Broers*) He has been a member of our Council. I know him personally very well.

(*Mr Burch*) We have agreed we have got to try and work together and be complementary rather than duplicative but exactly how it is going to work in

[**Mr Heath** *Cont*]
practice as we move down the track, remains to be seen. They have hardly got any of their boards in place yet. The next meeting I think is at the end of this month.

116. You are effectively a set within their larger set?
(*Mr Burch*) Yes, that is how we drew it exactly.

Bob Spink

117. You are at the top.
(*Mr Burch*) Yes.

Mr Heath

118. How about the Engineering Council?
(*Mr Burch*) That has stopped. It died on 31 March. The Engineering Council UK is the registrant body which maintains standards for registration working within the Engineering and Technology Board. I am sorry if I am confusing you.

Mr Heath: No. We have demonstrated now, or at least I have, my complete ignorance but I am grateful to you. I did not realise that.

Chairman: If we ever get that question on *University Challenge* or its equivalent we will know the answer.

Mr McWalter

119. I have got the bits and pieces at the end. I might mention that you talk about bringing people together, I once attended an artificial intelligence seminar where IEE people were with computer scientists and everyone was divided by a common language even though the only elements of the language were nought and one. It really would not have worked, it had to break up again because clearly it was impossible to do. I was interested in your paper when under the word "Policy" you said "The Academy has a strong track record of advising Government and Parliament on engineering matters". That struck me as a funny thing to put in a bit called "Policy". The word "policy" occurs in two or three other papers but we do not find out anything about your policy. It is almost like we have got a policy and these people have developed a policy. I wonder why the absence of any context to that?
(*Sir Alec Broers*) If I can answer that in several ways. We may have an official policy statement so the President is going out on dangerous ground by trying to define it. I have not been the President for so long. My policy is to make sure that we use our fellowship to the greatest advantage for the benefit of the country. Now that may sound a bit grand but it involves for a start advising Government. I think we should be the body that Government turns to when complex engineering issues are on the table. Our policy is to make ourselves available for that. I am also a Foreign Associate of the US National Academy of Engineering and that Academy is more tightly tied in to government than we are at the moment. I would like to see us move towards that position. I think we can help Government and there can be a mutual relationship.

120. That is an interesting thing to say but clearly once you have spelt out the policy as opposed to how you translate that into practice, the interesting thing is your policy is much wider than that. It could involve, for instance, giving kids throughout the country a positive view of engineering.
(*Sir Alec Broers*) I was focusing on that issue.

121. The policy lends itself to that in the way this particular bit of policy is rather narrow. Maybe it would be helpful to clear that up because if you develop a rather more generous definition of your policy it may be that we can evaluate the extent to which you are getting value for money.
(*Sir Alec Broers*) We have a statement in the front of our booklet.

122. I saw that when we came to visit you. I still found it was quite evasive, you might talk about that.
(*Sir Alec Broers*) We tried in our report to lay this out. I think we got to 14 points in the end.

123. This lunchtime I was dealing with some people who were calling themselves engineers who work at the Hounslow bus garage. Obviously they are not in your remit but clearly in a sense this Committee is interested in promoting opportunities for young people eventually to develop the technical expertise which lands them in Hounslow bus garage. Do you see that as completely outwith your responsibilities.
(*Sir Alec Broers*) No.

124. Do you think you have some role to play in fostering that interest in technical matters at that level?
(*Sir Alec Broers*) I think that is more the role of the institutions and the ETB than is our role. However, we would like to have our fellowship, our Fellows, be an inspiration to others and we are always looking at this. I was at a remarkable occasion last night for women in science and engineering at which Bonnie Dunbar the US astronaut spoke. That inspiration for young women I think is incredibly valuable and it may bring people into the first ranks of engineers; it is extremely important.

125. If we develop engineering special schools you are not going to be involved any more in sending a young whizz kid to inspire people.
(*Sir Alec Broers*) We take interest in our educational programmes.
(*Mr Burch*) We are already sponsoring three engineering specialist schools and we would love to sponsor more. Also we are in active dialogue at the moment with an organisation called Young Engineers which aims to go out to every school in the country at all levels to talk about what fun there is in going into engineering where you can build things and be part of the process. We recognise as well as industry recognises that it needs engineers at all levels to succeed.
(*Professor Dowling*) The Engineering Education Scheme that the Academy runs is in over 200 schools.
(*Mr Burch*) Yes.
(*Professor Dowling*) That is where schoolchildren do projects for local industry.

[**Mr McWalter** *Cont*]

126. Will you be involved in the Applied Science GCSE that is developing from this September and have you pushed for there to be an Engineering GCSE/A level?

(*Mr Burch*) We responded to the Education 14–19 Paper pushing the importance of engineering. Engineering schools are for science, maths, technology and, yes, we push for that to be recognised as an important strand of education.

(*Sir Alec Broers*) I have somewhat unconventional views on this perhaps but I do not think it is necessary to have an engineering course in a school. Sometimes I wonder whether we should even classify students as engineers when they enter university, that should be a choice they might even make after their first year in university, for example. Very often people are not sure exactly what they want to do. I have seen in university quite a crossover from the science subjects to engineering, even in the second and third year in universities it is made possible. Young people may not necessarily see this as their life's ambition until they get involved in science and then they see that it would be extremely exciting to take that science and really apply it and really take it into the market place and do something. I do not think we need to drive them in that direction early on, let them mature a bit further and then they will see the advantages of becoming an engineer.

127. A very interesting view but it sits rather badly with the idea of Engineering Specialist Schools, for example, if the Academy has that view.

(*Sir Alec Broers*) There are pros and cons.

128. Yes.

(*Sir Alec Broers*) For some people who are very keen indeed and know what they want to do in their lives then those schools will be very beneficial and they will train them in a very specialist way; there are others who do not.

129. Would you like the Royal Society to hand responsibility for engineers over to you, along with some extra funding? Do you have any idea how much the Royal Society spends on engineering projects?

(*Sir Alec Broers*) I do not know how much they spend on engineering projects.

130. 10 per cent.

(*Sir Alec Broers*) Certainly I would not like them to hand them over to us, I would lose my Fellowship for a start. No, I think it is very important that we overlap because we are part of science. I do not even know where the boundary is sometimes. I have spent part of my life with electron-microscopes looking at leukemic blood cells with doctors at the same time as I was managing an engineering project putting in $100 million worth of equipment into a semiconductor factory, and I was those things at the same time. It was not that I was part of the time a scientist and part of the time an engineer. I did it at the same time and one thing fed off another. I think really to try and draw these distinctions is a great mistake.

Chairman

131. We have come to an end, sadly. Thank you for being succinct, clear and giving us great guidance in terms of this inquiry. We know much more about learned societies now and what they do and we will be doing our bit in our report. Thank you very much, Sir Alec, for bringing your team. I always did prefer your *Desert Island Discs*.

(*Sir Alec Broers*) I will not get into that, Chairman.

WEDNESDAY 12 JUNE 2002

Members present:

Dr Ian Gibson, in the Chair

Mr Parmjit Dhanda
Mr Tom Harris
Mr David Heath
Dr Brian Iddon
Dr Andrew Murrison
Geraldine Smith
Dr Desmond Turner

Examination of Witnesses

Mr David Clarke, Chief Executive, Professor John McDermid, Vice President and Professor Wendy Hall, Vice President, British Computer Society, examined.

Chairman

132. I am sorry about the delay. We had some internal business to discuss about other inquiries we are setting up. I am sorry about the space, we did not know we were going to be that attractive. We know the Transport Select Committee often has big audiences but obviously science is moving up the agenda, I am sure it is because the British Computer Society is number one on the agenda. We welcome you here to help us in our inquiry. You will know we are looking at Government funding of learned societies and looking for views. You have probably read some of the scripts and some of the thoughts that we have had from other organisations. We will have to be very sharp and could I encourage you to make your answers as short-lived as possible, but not to miss out the major points.

(*Mr Clarke*) Yes.

133. If subsequently, when you go home and you are shaving or whatever, watching England achieve the impossible—

(*Mr Clarke*) I spot a Scottish accent.

134.—could I say you can always write in subsequently if you feel you have missed out a point or we did not ask you something or you did not have a chance to make a point. Let me start off then. Your memorandum expresses concern at the lack of representation in the "newer sciences" in the Royal Society. Could you explain, briefly please, what you meant by that? It can be any one of you.

(*Professor McDermid*) If I may respond to that. Our concern particularly is in the area of computing but, more broadly, science in technology is moving very rapidly. It seems that the Royal Society in particular is relatively slow in adapting new areas, new technologies. I cannot say they do not have any ability to respond. They have recently elected a fellow in nanotechnology which is very new but broadly there seems to be a problem.

135. Okay. The Royal Society has told us that there are actually two panels dealing with computing, however. What is your assessment of the current Royal Society panel arrangement for computing in that case?

(*Professor McDermid*) There are two committees who admit fellows from computing. One is mathematics in computing and therefore it tends to appoint people much more at the theoretical end of the discipline. There is an Engineering Committee which tends to appoint people more from the engineering electronics end of the discipline. Our concern is that there are a broad spectrum of activities within computing which are not perhaps well matched to these two particular committees. Our feeling is it does not cover the whole spectrum very evenly or very adequately.

136. Another factor is in your submission you say there are 20 out of 1,600 research academics in computing who are FRSs, Fellows of the Royal Society. The Royal Society claim they have 50 computer scientific fellows. Can you get the discrepancy together somehow? What is the difference? Why?

(*Professor McDermid*) I would have to say honestly that it is very difficult to disinter from the Royal Society website who is in what area. My suspicion is their 50 includes a lot of people who apply computing as a major element of their research in other areas but I cannot be certain. If you want a detailed answer I would have to go away and do a bit of research to get that.

137. That would be quite useful so we know we are talking about equal figures here. You are further critical of the scientific advice provided to Government by the Royal Society and indeed the Royal Academy of Engineering. You think that they lack expertise in these modern arenas we have just been talking about.

(*Professor McDermid*) I am not critical of advice in particular but saying that they do not have the depth of expertise one would hope you would be able to call on when looking at particular problems.

138. You feel you have been shut out in this process?

(*Professor McDermid*) Not the Society in particular, I was thinking of the community more broadly.

139. Do individual members of the computing community—if I can put it that way—feel that they are not incorporated into the general thinking?

(*Professor McDermid*) That is right. I think that is a good summary of the position.

140. Okay. You have not been consulted at all about any of these issues as a Society by the Royal Society? Do you have contact with them?

[**Chairman** *Cont*]

(*Professor McDermid*) We do but David is perhaps better able to address that than I am in terms of formal contacts.

(*Mr Clarke*) Yes. We have some contacts but I would not say that it is routine for the Royal Society to ask our views on these issues.

141. I am sorry we are galloping along.

(*Mr Clarke*) We understand. We are happy.

Dr Turner

142. You say that the Royal Society and the Royal Academy of Engineering research fellowships are particularly valuable. Do you think they are more effectively administered than Research Council fellowships?

(*Professor Hall*) I am sorry, can you say that again. What was the question?

143. Your written evidence suggests that you particularly value the research fellowships of the Royal Society and the Royal Academy of Engineering. Is this because you think that they are better at administering these fellowships than the Research Councils?

(*Professor Hall*) They have a different focus. They are administered in different ways. They are seeking to do slightly different things. I think our main concern is that we need more money in this area. We need more of this type. We do not want to do anything which would prejudice getting funding through.

Chairman

144. You do not want us to take it away from them and give it to you, of course.

(*Professor Hall*) No, far from it. We would not want that. No, no. I think they do serve different purposes. The Royal Society fellowships are quite long term. They are actually seeking to take somebody young and let them develop their career without any impediment to worrying about tenure or administration or teaching. The EPSRC fellowships are shorter term, five years is still a long term and they are very valued fellowships. I have had a five year EPSRC fellowship for the first time in my life. They are peer reviewed on a different sort of spectrum. They are looking more, I believe, at particular areas and letting people focus on those subject areas. There is still a career element to them but I think the Royal Society ones have tended to be much longer term. The Royal Academy ones have a much more practical focus which neither of the others can really attend to, they are much more about getting industry and academia to work together and to collaborate and interact. I think they have a third focus again.

Dr Turner

145. It has been suggested that subject areas like yours which are multi disciplinary are much better handled by a learned society than by the research councils. Would you agree with that point of view?

(*Professor McDermid*) Perhaps if I can make a brief observation on that. I think it is difficult to get research proposals to bodies like EPSRC which are multi-disciplinary seen on a balanced basis and to get some of this work funded. I do not think the Royal Society has the mechanisms in place to support broadly based research proposals. They may be better placed to support individual fellowships which are multi-disciplinary but I do not think the broad research programmes that EPSRC put in place, they may deal with part of the problem, certainly they do not address all of it.

146. Would you like to see more learned societies brought into the business of promoting fellowships with a wider spread of government funding for that purpose?

(*Professor Hall*) I think the role of the learned societies is to provide the community. Personally I would not like to see the BCS have to set up the administration to run the fellowships. I think the EPSRC has that well sorted and the Royal Society, given that we would argue that it should be quicker to move to new areas, is also well set up. I think the role of the learned society is to provide the community. We would ask them to consult us as to who is the expert in what area. Most of us academics who are members of the BCS at professor level are on the EPSRC peer college and we do peer reviewing and therefore are involved very much in the EPSRC fellowship awarding.

147. Are you happy with the involvement that you have with the other learned societies in awarding them fellowships? Is your input sufficient do you think?

(*Professor Hall*) The input will tend to draw on the fellows. John and I are both fellows. I am a fellow of the Royal Academy so I get involved in reviewing and in their processes. We are both involved in the EPSRC because of our status in the academic community.

148. Do you feel that you are consulted sufficiently about the Royal Society?

(*Professor Hall*) No I think I would support John in saying that we would like them to consult us more about who is expert in what area and who should be commenting on what subject.

Mr Heath

149. Can I just quickly bring Professor McDermid back to the point about inter-disciplinary projects and the difficulties there.

(*Professor McDermid*) Yes.

150. Is that down to a structural problem within the process of application or is it a failure of assessment or a failure of imagination?

(*Professor McDermid*) I think it is the first two but not the third. Structurally you have to submit a proposal to the EPSRC to one panel or another and inevitably they are less expert and perhaps less willing to spend money in what they perceive as another discipline. It is very difficult also to find referees who can give a balanced view of a proposal. I have no evidence that the third thing you mentioned is a problem.

Chairman

151. Before I turn to Tom Harris, just a quick one. Have you ever looked at the correlation between the research assessment exercise, which you know this Committee has looked at, and the distribution of Royal Society fellowships, for example? Have you ever seen a curve?

(*Professor Hall*) We have some.

(*Professor McDermid*) We have some data but I think not on Royal Society fellowships.

(*Professor Hall*) No, we have not done that correlation. We have the data on the RAE. I was on the RAE and we both know the Chair and he has given data on the spread of subject areas.

152. Have you a general conclusion to make quickly about that?

(*Professor Hall*) A lot of the work that has been assessed in the research assessment exercise for computing is not covered in the Royal Society.

Mr Harris

153. Can I ask you about funding. Some learned societies have suggested to us that by accepting Government funding it is compromising their own independence. Would you agree with that and have you sought Government funding yourselves? I understand you do not actually grab funding but have you ever asked for it?

(*Mr Clarke*) No, we have not. I think probably we would feel that way, that it may compromise what our community expects us to provide.

Chairman

154. Could you elaborate on that? How could we embarrass you?

(*Mr Clarke*) Certainly not by giving us too much money I think. I think the independence is quite important. I assume that whenever there is funding there are some strings that go with that which push you in a certain direction in terms of what you do with that money. From our point of view I think being independent and able to provide our community with what they and we think they need is a very important part of what we do.

Dr Iddon

155. Can I ask, Chairman, where the funding streams come from at the moment: publications, subscriptions?

(*Professor Hall*) Subscriptions. A small amount on publications.

(*Mr Clarke*) Yes, and we have products that we sell. We have a whole raft of strings.

(*Professor Hall*) Actually quite a lot which goes way beyond academia. A lot of our revenue at the moment comes from our ECDL, the European Computer Driving Licence, which is aimed at anyone who can turn a computer on. It is very successful and it is a very broad spread.

(*Mr Clarke*) It is about computer use. It is a very successful series of programmes.

(*Professor Hall*) We are reaching a lot of the community in that way.

Chairman

156. The corollary of what you are saying is the Royal Society should be embarrassed by government funding or there will be a compromise at least for government funding, does that follow logically?

(*Professor Hall*) No, I do not think so.

(*Mr Clarke*) No, we speak for ourselves.

(*Professor Hall*) I think we all want to see more funding going to science and engineering technology. We want to see more funding of the type of fellowships and support for people to do serious research work in this area so the UK can be at the forefront of what is going on. I think the learned society's role is to advise and be the body that is consulted in their area as to what the state of the art is in its area. The Royal Society and the Royal Academy have a broad brief across all subjects of excellence and quality and that is terribly, terribly important. All I believe the learned societies areasking is to be part of the consultation process.

Mr Harris: The BCS understands and supports an increase of government funding for the Royal Academy of Engineering on the basis that there has a comparable level of activity to the Royal Society. Can I ask you to incriminate yourself? If the cake remains the same size, would you support one coming down and the other one going up to support exactly the same level of funding?

Chairman: We do not ask difficult questions.

Mr Harris

157. And presumably the same level of lack of independence.

(*Professor Hall*) No. We would like to see the cake go up I think is the answer to that.

(*Professor McDermid*) Yes, I think that would indeed be our view. Practically as well it is very difficult given the programmes the Royal Society has already, in fact, to cut funding because they have a number of long term commitments. I think it would cause very great practical problems as well as problems of principle.

158. Can I just lastly ask this question. Has the Government asked for your advice over the last five years and do you think the Government should seek scientific advice from learned societies other than the Royal Society and the Royal Academy of Engineering? Has it done so with yourself?

(*Professor McDermid*) The answer is yes, I believe it should, particularly in this area where we have access to more expertise through our membership and fellowship than the Royal Society and to some extent the Royal Academy. Certainly there are a number of instances. We have given advice on micro-electronics to the House of Lords recently. We have put an input into the Gareth Roberts review of funding of science and engineering and technology. This is done quite often, we wish it was done more. There are times when we feel we are not consulted on areas where we have the expertise. It is probably our fault for not being clear to the House where we have the expertise.

Chairman

159. Do you submit to Departments at all in departmental consultations? Is that your route for information? Do you tell Transport how to get their computer systems right and the Inland Revenue and so on?

(*Professor Hall*) I have to say I think historically we have been reactive rather than proactive. Over the last two or three years we have started to build a strategy where we will be more proactive, or at least as much proactive as we are reactive. In the past we have been too reactive as a society. We are a relatively small and relatively new society.

Dr Turner

160. Have you never been asked to give advice on some of the more major computer involving projects where over the years the Government response has gone disastrously wrong?

(*Professor Hall*) Not as a Society.

(*Mr Clarke*) So far as I know I do not believe so.

(*Professor McDermid*) I was going to say yes until your last qualifying point there actually.

(*Professor Hall*) Not as a Society.

(*Mr Clarke*) As individuals a number of us have. One of the other Vice Presidents has some involvement with the Office of Government Commerce in the programme the gateway reviews that they are putting in place. No, in general, the answer is we have not been asked to help those interesting challenges.

161. Do you think the Government might have benefited in the past if it had?

(*Professor McDermid*) Yes, absolutely.

Dr Iddon

162. I would have thought your Society is fairly healthy. You say you are young and obviously you must be still growing but can I ask you how healthy you do feel and what are the main issues that you are wrestling with at the moment and what are your main concerns for the future?

(*Mr Clarke*) I think we are in that position that you describe and certainly we want to continue to grow as a Society. We are growing. We want to make sure that we are relevant to our community and that is always a question of as the needs of our community and the people we are trying to serve changes we have to make sure we are at least up with that and in front of that. We have to make sure that we offer value in every sense to our members. We are constantly reviewing that so we can attract more people in the IT industry. We are not complacent about it either because a lot more people have come into this industry in the last five and ten years and if you take our market share, if you look at it in those terms, we have got a reducing market share of people who have come into this industry because so many more have come in and have joined us. We think there is a challenge there. We have to make sure we are absolutely relevant to this community and we offer them the things they want from us.

(*Professor Hall*) I think the role of the learned societies is changing and evolving as we speak. I have just come back from a meeting of the ACM in New York which is our equivalent in America. They make most of their money out of publishing and their membership is going down all the time. People seek less needing to belong to them, they buy their publications, they are seen to be the top in the world in publications. We are very much a membership society and serving the community. Things like this, being a spokesbody for the community I think is one of the things which is very important as we move forward.

163. When your council meets what are the big issues that you need to discuss to see into the future?

(*Mr Clarke*) I think they are predominately around where we see the industry going. One of the things we need to do to be able to represent our potential and new members, particularly new members, one of the things we need to do to attract more people into our Society than we currently have, you do tend to get a relatively narrow spread of the IT industry into the organisation, we need to widen that. How do we serve that better? We have just invested a lot of money in taking all of our services on line because that is a vehicle that a lot of the new people coming into the industry use. So just making sure we are still relevant to the people we are trying to serve is the primary thing that the Council look at.

164. Do you have a decentralised network in the regions?

(*Mr Clarke*) Yes, we do.

Mr Heath

165. I am just wondering: as the profession and the industry matures how are you going to avoid what happens in the other areas of splitting up into constituent parts as more people declare themselves specialists in one area or another and do not feel the need for an umbrella body?

(*Mr Clarke*) We have a number of specialist groups already. I think in order to speak on a number of issues you have to represent the industry. It is not enough just to represent a specialist group. You need the expertise at the specialist level but you need to be able to speak on a wider basis in order for people to take what you are saying seriously. I think our members believe we need to be both of those. Certainly we do believe—the people running the Society—we have to have both specialist focus, real in-depth knowledge on specific issues, but also be able to represent the whole industry when that is the right thing.

(*Professor Hall*) Your question highlights the point also of the tension between the subject growing and people splitting off and the need to do inter-disciplinary work.

166. Yes.

(*Professor Hall*) It is a huge tension. It is a tension the RAE really militates against, and universities themselves are trying to overcome this. It is very difficult because you get immediately into three or four dimensional matrices. I believe that the Royal Society and the Royal Academy have a huge role to play in this in the inter-disciplinary nature of things

[**Mr Heath** *Cont*]
because they should be set up for that. That is something I think they should really focus on whereas the learned societies which represent a particular community are going to have much more. We have to have a relationship with every other society if we are going to do that and they can organise it much easier.

Mr Dhanda

167. Just very briefly. I would be interested to know, you talked about your relationship with the industry, what is your relationship like or indeed do you have any kind of relationship with the trade unions which represent people in the IT industry?

(*Mr Clarke*) To be honest we do not. We have very little contact with the trade unions. It is really a member organisation.

168. There will be a crossover amongst your members and their members and in terms of understanding the industry.

(*Mr Clarke*) That is a very good point. I think it is something we ought to look at a lot more closely than we have done. We have not really looked at that too closely.

(*Professor Hall*) Many of us are members.

(*Mr Clarke*) Absolutely.

169. I would be happy to make the introductions for you.

(*Mr Clarke*) Thank you.

Chairman

170. I have to bring it to an end sadly. I know we would have liked to have asked many more questions and you might want to make more points but as I did indicate please write to us. Thank you very much for answering some of the questions we have asked you and also telling us of your ambitions. I think we are much more knowledgeable about the Society now and hopefully you will be in contact with this Committee again if there are other issues which come along. Thank you very much for taking the time out. I am sorry it has been so short.

(*Professor Hall*) Thank you for the time.

(*Mr Clarke*) Yes, thank you.

Chairman: Thank you.

Examination of Witnesses

Dr Rita Gardner, Chief Executive and Mr Elliot Robertson, Policy Officer, Royal Geographical Society, examined.

Chairman

171. Dr Gardner and Mr Robertson, thank you very much for coming. You have been sitting in I take it and you have seen the format.

(*Dr Gardner*) Yes, we have.

Chairman: I hope you do not feel we savage you too much. We are trying to gain information about how the societies work and as you saw we learnt quite a bit there. The first question will be asked by Geraldine.

Geraldine Smith

172. I understand you believe there should be a more equitable distribution of government funding to learned societies. Can you tell me how you think the Government can make those decisions over which societies to fund?

(*Dr Gardner*) I think the purpose of your investigation here is very much in terms of those that contribute to wider public understanding, to encourage the electorate in a sense to be more responsible in their understanding of issues and perhaps in their voting on such issues. The second is in terms of the area of providing advice to Government. I think that there is much expertise in the learned societies, some are much more active than others. That expertise they have amongst their professional members, those of them with very up-to-date research knowledge and balanced expertise and increasingly they have an ability to engage with the wider public, we are all in that business. There is a great pool of discipline-based resources and we feel that this activity and expertise should be more widely used, perhaps, by Government, acknowledged and recognised by Government, than sometimes it is. The Society, for example, is widely used and associates through events with DTI, DLTR and so on. Your question was should there be a more equitable distribution.

173. I understand you favour a more equitable distribution but how do you think the decision should be made apart from inquiries like this?

(*Dr Gardner*) I think because the learned societies are variable in the extent to which they are active in the areas you are talking about then that distribution would have to look at the outputs from those societies in those areas as against the objectives of those societies in terms of their strategic aims.

174. Is there not a danger that if there is a more equal distribution of funds that you just end up spreading it more thinly and the funding then becomes inadequate for everybody?

(*Dr Gardner*) There is a danger always when you distribute funds in that way but I think all of the learned societies and bodies act to a strategic plan, act to implementation objectives on an annual basis and those would need to be monitored against their delivery.

175. So how much money would your Society want?

(*Dr Gardner*) Gosh. I would not want you to misinterpret in a sense an equitable distribution. What I am saying is the expertise is there and many societies are funding that expertise in those areas from wider fundraising activities. In many cases it is not large sums of money which are involved. We spend, for example, between £300,000 and £350,000 a year supporting our activity in those two broad areas, which is advising Government and the wider public understanding area. A lot can be done with a relatively little amount.

Dr Iddon

176. Do you think Government should pay for that advice if they do not fund you directly in the first place?

(*Dr Gardner*) I think there are different types of advice. There is very much direct advice and then there is a form of networking and engagement in events where advice can be shared. At the moment Government funds are sometimes for the latter through sponsoring, individual departments do sponsor some of our events. That is very time consuming and I think there is a case to be made for a more sustained funding at a relatively low level for organisations that are known to be active and known to provide in this case events and activities which are widely supported and used by a variety of Government departments. For example, if I can just quote, this is just one of the examples, a quote from Paul MacIntyre from the DTI in a letter following a meeting that we organised in May. "I would like to think that the Department and the Society can work closely together in future whether through participation in events like the Regional Development Agency's conference or in other ways. As a general matter we are trying to improve the evidence base for our policies and also to listen more to experts outside the Department, including academics, so that our policies are better informed."

Geraldine Smith

177. Can I just ask about your independence. Do you not think if you receive government funding that maybe that could be compromised somewhat?

(*Dr Gardner*) I think it depends what you are receiving government funding for. The learned societies stand for expertise and balance, they are not lobbying organisations in a sense. If we felt as an organisation that money came with expectations that would lead us to question our management and our impartiality, in a sense, if the money came with those strings attached then I think the Society's Council would be worried and would be concerned about accepting it. I do not necessarily think that government money does come with strings attached. After all we accept sponsorship from a wide variety of departments at the moment for events and that does not imply that in any way we take other than an impartial view and never have we been asked in any

[Geraldine Smith *Cont*]

way to do that. Indeed the Society received an award from DCMS from 1859 until 2000, £54,000 a year, to open its Map Room with a million maps, the largest private collection in the world, to the wider public. It started at the time of the Crimean War when in fact it was felt that the public should have access to mapping information. As part of the Spending Review in 2000, sadly, the resources in that area were redistributed and our government funding was stopped.

Chairman

178. So no-one will ever see the maps now?

(*Dr Gardner*) Because we feel that it is important that our resources are publicly available, we are a charity, we then set about applying to the Heritage Lottery Fund. The Lottery Fund has supported us with a £5 million grant for public access to our resources. That leaves us still with the problem of the current expenditure in maintaining access to those resources.

Geraldine Smith

179. Finally, if you think that the funds are evenly distributed, can I ask you who you think gets too much?

(*Dr Gardner*) I think that is a really impossible question to ask and to answer. We are a community that is a supportive community. It is a community of academic expertise and inter-disciplinarity. For example, the Royal Geographical Society has engaged recently, for the last two or three years, in a joint research programme with the Royal Society on the Capricorn shoals, in the Indian Ocean. I think you are asking an impossible question. I would like to say that there is much expertise, much willingness and increasingly an ability to engage with the wider public understanding of issues in the learned societies. I would like to see the pot a little bit bigger. Everybody always says that but the sums to bring about quite a lot of change in a bigger pot would be relatively small.

Dr Murrison

180. Dr Gardner, you have said that you would like some government funding and I was wondering what you would do with the money?

(*Dr Gardner*) What we would do with the money?

181. Yes?

(*Dr Gardner*) I would like to write to you about this afterwards, if I may, but speaking at the moment. We would be keen to widen the way in which the outputs are disseminated from our Society and Environment Forum programme, for example, which brings together academics, those from Government, NGOs and others at chief executive or just below level to debate issues of our time. For example, we have held meetings on the Urban White Paper, on redeveloping the coalfield areas, on air transport, so they are policy issues of our time. I think there is much to be gained there for improved dissemination of the outputs from those and possibly having the facility to hold some of those meetings not just in London but on a more regional basis around the country. So the funding would be in a sense to support a growth of that programme and it has been welcomed, as I say, by a number of government departments and many agencies as well, to support the dissemination of outputs from that programme, that is one area. The second area is at the moment we have funding from the Mercers Company to do a pilot project which is making geographically related information, it is called Geography in the News. Geography in the News is there to deliver balanced, up-to-date knowledge. At the moment it is geared towards teachers of 14 to 19 age range. It is taking up to date knowledge from the research community and presenting it in a multi-media way that is relevant to teachers. In an era where we have lost, for example, the stature perhaps of some of the television reporting, perhaps sometimes programmes such as used to be *Panorama*, we would like to take that programme and extend it from teachers into a muchwider public understanding on the Internet of issues of our time which have a geographical perspective. Geography, as you know, is very much concerned with the interaction between people and their environment and understanding physical processes and social processes associated with that interaction.

182. You are talking about specific projects.

(*Dr Gardner*) That is one way. I thought you were asking me about specific projects.

183. That is what I want.

(*Dr Gardner*) Yes.

184. My point is the money you would envisage Government giving you, you describe very nicely, it would be for specific projects rather than a bucketful of money and the Government saying "Here you are, have this and there are no strings attached"?

(*Dr Gardner*) In our institution, and I cannot talk for others, we have limited resources and we are highly accountable through a strategic plan and an annual implementation as to how those resources are spent. I think one would normally in this day and age expect resources to be associated with clearly defined areas of activity and outputs from those. To have a sum of money that in a sense just contributes to a core funding in our case, because of what we do, whilst it would be very nice I think is probably unrealistic.

185. Can I draw you a little bit on a previous set of questions. I want to try and get you to commit yourself a little bit more on a specific area of funding disparity. In particular I wonder if you may comment on the disparity between the funding given to the Royal Society and the Royal Academy of Engineering, particularly in relation to the outputs that they produce?

(*Dr Gardner*) I am sorry. I really do not feel I know either of them sufficiently well to comment effectively.

186. You did say in your evidence that the Royal Geographical Society " . . . would greatly welcome a more equitable distribution of government funds to learned societies".

(*Dr Gardner*) Yes, I did indeed.

187. You have laid yourself open to the question.

[**Dr Murrison** *Cont*]

(*Dr Gardner*) I have to some degree and in my first answers here this afternoon I suggested that we would indeed welcome a bigger pot of funding and a more equitable distribution across that bigger pot. I really do not have the detailed information—and I do not think I see it as my job—to be able to comment on the detailed finances.

188. To have made that statement you must have had a fair idea about the distribution of funding between the learned societies and their outputs.

(*Dr Gardner*) I have, as indeed most people would, a broad understanding of the level of funding across the institutions which are being funded. I do not have specific knowledge of the particular allocations of certain amounts of funds to certain activities. In terms of the broad levels of funding of organisations, yes.

Mr Dhanda

189. Mine is a question about Research Fellow schemes in geography. If the Government were to find the money to fund one, would you be willing and able to implement it?

(*Dr Gardner*) Currently we run a grants programme which administers of the order of between £100,000 and £150,000 a year so we have the infrastructure to manage grants and associated peer reviewing processes linked to those. In a theoretical sense, yes we would have the infrastructure and capability. Also, because of our membership, we draw very widely on the academic community in geography and the capacity would be there to administer that. I think one would need to look very carefully to ensure that Fellowship schemes complement existing programmes and other schemes associated with generating research knowledge. I think it comes back to the point perhaps that the Computer Society were making, the Fellowship schemes, we would see would need to be highly complementary and not covered at the moment by funding which would exist through other organisations, whether that is funding through Royal Society, funding through some of the Research Councils and so on.

190. Fundamentally you are saying it is a good idea and it is something that you would be willing and able to operate?

(*Dr Gardner*) In a vacuum, yes, it is a good idea and it is something we would be willing and able to operate. We would be willing, also, to work with partners who are operating those to provide our geographical knowledge and expertise in that way. I would be delighted if extra funds were available by the way.

Chairman

191. The last question, because again we have to move on, you understand, and thank you for your frankness. You took over as the UK representation on the International Geographical Union from the Royal Society in the year 2000.

(*Dr Gardner*) Yes.

192. Do you pay the subscription in full? Do you receive any government money to pay that subscription?

(*Dr Gardner*) We have an arrangement with the Royal Society whereby the Society pays 51 per cent and the Royal Society pays 49 per cent if I am correct.

193. That is right.

(*Dr Gardner*) It started off on a split of 15:85 per cent and then went to 25:75 and then to 59:41 over a period of three years.

194. Has the Royal Society had its funding reduced to allow for that?

(*Dr Gardner*) Sorry?

195. The fact you have taken over the funding, did you pinch some of their money for the funding, as it were, from the Government?

(*Dr Gardner*) No. For our 51 per cent share, it has come out of our funds that we raise.

Dr Iddon

196. Could I pose the same question, Chairman, as I posed to the last Society and ask you about the health of your general subject area and what are the big issues your Council discuss and have you got any concerns for the future? For example, universities' geography departments, that is a concern of mine.

(*Dr Gardner*) Yes, of course, we would not be doing our job, perhaps if we did not have concerns. The big issues that we have at the moment are a large area of making increasingly better use of our expertise, that is the knowledge within our members and Fellows, and also our collections. With a £6.7 million project to open our archives to the world, put them on the Internet and enhance them educationally, just managing that over the next two years is quite a major project. Secondly, we are concerned to ensure that geographical expertise is brought increasingly into evidence based policy. We have a number of geographers around the country of considerable note, some indeed are working well within policy areas but there are others, and other research that could be brought more to the fore. The third area is that of restructuring post the research assessment exercise which you referred to. We have just been discussing that today in fact in the Society, we had a meeting on that. We have seen geography departments reduced in terms of numbers by about 20 per cent but at the same time we have seen the under graduate intake go up. What we are seeing very much is a change in distribution within rather than a reduction in the standing of the subject outside. We are keen, obviously, to monitor that and to see how that works through to work with the subject. The fourth area—and I have only five in case your eyes are starting to glaze over—is in terms of professional standards. We were awarded by the Privy Council last year the ability to implement a chartered geographer and raising the professional profile and standard for chartered geographer, and that is an issue for us. We do that well. Lastly, of course, there is the Education Bill which is currently going through Parliament at the moment. We welcome greatly widened access at Key Stage 4, very good. We would like to see some changes particularly but entitlement to access to a humanities subject, we would like to see

[**Dr Iddon** *Cont*]
entitlement to access to history and geography, not allowing schools simply to teach either history after the age of 14 or geography.

Mr Heath

197. I have a 14 year old girl who has just had to make that difficult decision so I sympathise on that.
(*Dr Gardner*) Yes.

198. I would just like to follow up on that last point about school education. The geography syllabus seems to be one that has changed considerably over recent years in scope and its method of teaching. Do you formally as a Society has an input into curriculum development and if not is this something you should have?
(*Dr Gardner*) We do. We are part of the QCA working party. They are undertaking a review at the moment on the geography curriculum. We have convened the review for the 14 to 19 age range, bringing together expertise from amongst our fellows and across the discipline. We have also a regular liaison meeting with DfES, twice yearly, when we can raise those issues. We co-ordinated and facilitated in terms of higher education the benchmarking standard for geography across the higher education community. We have worked very closely with QAA and with HEFCE and others, we have and we continue to do so.

Chairman: Thank you ever so much indeed for taking the time to come and answer our questions. Our report will come out in the fullness of time and if there is anything you do want to write to us, as you indicated you might, please do so. Thank you very much.

Examination of Witnesses

Dr David Giachardi, Chief Executive and General Secretary, Dr Barry Price, Honorary Treasurer, Mrs Libby Steele, Manager, Professional Education and Development and Dr Stephen Benn, Parliamentary Affairs Officer, Royal Society of Chemistry, examined.

Chairman: Can I welcome the third of our witnesses this afternoon, the Royal Society of Chemistry. Some of us, of course, know each other quite well from meetings we have done through you having the Select Committee along and you have helped us in our work . You have helped us in our work, and we are glad to see you back here helping with this particular inquiry. Brian has a statement to make.

Dr Iddon: Chairman, could I declare an interest. I am a Fellow of the Society and I shall not take part in the proceedings.

Chairman: Right. Thank you very much, let us start with Des in that case.

Dr Turner

199. The Royal Society does not like to take the Government's shilling for fear of compromising your independence and yet you are happy to accept rent free accommodation in Burlington House which is a pretty choice piece of inner London real estate which must have quite a considerable value, I have no idea what it is, perhaps you could tell us what the rent free status is worth in hard cash?

(*Dr Giachardi*) Thank you. It is very hard to answer that question because although part of it is very elegant indeed, there are parts of it, where Mrs Steele works, for example, in the basement, which are extremely unpleasant. While I cannot answer the question as you phrase it, I would make a couple of observations. We have spent, in the last two or three years, well north of half a million pounds on refurbishing the building to the exacting standards of English Heritage, and that has entirely been done out of our own money, out of our member's money. It is a very complex issue. We had a long running discussion with what I suppose is now the Department of Local Government and the Regions, what was DETR and DLTR, about tenancy status there. We are doing that in conjunction with the other learned societies that live around the courtyard. We have been there since the middle of the 19th Century and the dispute is whether we are tenants at will or have rights of estoppel. We, the five learned societies, have agreed to club together to put some money down to actually test this in the courts. I cannot answer the question what the rental value would be but we have spent a lot of our own money restoring the fabric, as I say, to the exacting standards of English Heritage.

200. If rent-free status were to be withdrawn presumably it would make a considerable difference to your finances?

(*Dr Giachardi*) It would be very serious. In the pack that has been left, or has been distributed, you will see that our budget for this year is roughly break even and were somebody to ask us to pay a significant amount of rent I am afraid that would be money that we could not spend out of our own resources on, for example, things like education.

201. So in effect you do receive some indirect government subsidy so it does not quite square with your somewhat bullish attitude towards government funding, does it? Do you really think it compromises you to have Government funding?

(*Dr Giachardi*) I think it has been around for so long that I do not think it does.

202. Right. You say that you act in an advisory capacity for Government and you think this is a core activity, hence your need you feel to be financially independent of Government, but this cannot be said, of course, of the Royal Society or the Royal Academy of Engineering. Do you think the fact that they are to a large degree dependent on government finance affects their advice to Government in any deleterious way?

(*Dr Giachardi*) I think what one has to deal with here is the difference between what is probably reality and what is perception. The reason that we do not want any money is because I would be horrified to think were we to get any government money, and we do not want any, were we to give advice it was actually compromised by the amount of money, but it would be perfectly possible for today's media to make the point that it was and once that hare has started running it is a very difficult one to stop. I have no idea what goes on in the Royal Society and I would not dream of treading on their toes, but while we are in a financial position at the moment to do what we do, and I hope our advice to Government in various forms is valued, that we can do that in the way that we do at the moment.

203. If Government were to offer you funding to operate a Research Fellowship scheme, would you consider taking it? Would you consider that as something quite separate from your other activities? Would you be prepared to do it? Would you be interested?

(*Dr Giachardi*) In terms of government money, again in the pack there is a listing of what we have had by direct funding, which is very small numbers, and what we have had by specific contracts we have won in open competition where we have a specific expertise. If we did not have expertise in education in chemistry we would not be doing our job but those have been won in open contract. In terms of running a Fellowship scheme, the first observation I would make is we are not geared up to do that. We just do not have the mechanisms in place to do that. I would be a bit reluctant to do that because I would not want to get into the position of our particular Society being seen, and again it is about perception, to favour one particular university relative to another. The world of chemistry is in some difficulty at the moment anyway. However independent the committee we set up were to be, I would not want to be seen to be in the middle of something that was difficult. As I say, we are not geared up for that at the moment.

Chairman

204. But you have got the Research Assessment Exercise which would be quite good guidance in terms of where you allocated the money. We asked the previous group of witnesses if they had looked at the allocation of, for example, the Royal Society fellowships *à la* grade five and five star departments and if there was a correlation that would be good way to start. I would look at how many a university had and allocate them there. Would that not be a way that would make you appear neutral if there was a different exercise to relate the departments one to the other?

(*Dr Giachardi*) I accept the point but it is not obvious to me why if one is going to have chemistry fellowships they necessarily could not come through EPSRC, for example.

205. That is a point we have made, of course. There are two mechanisms in operation, how do they differ from each other?

(*Dr Giachardi*) The answer is I do not know but there may be some benefit in a plurality of mechanisms. I doubt there is merit in three levels of mechanism.

Dr Murrison

206. You are very active in public communication and understanding of science. I was wondering if you think that all learned societies can play a role in this work or would it be better done in a collective way?

(*Dr Giachardi*) In many cases it is. I think by common agreement there is a problem in public perception and understanding and appreciation of science, science and engineering for that matter. It is a real tragedy that in the country today everybody walking on the streets accepts the benefits that they derive from the advances in science and engineering in terms of quality of life, the fact that our cars work better, our aeroplanes are safer, that we have better health care, and yet science does not have a very good public image. We try and do our best from the chemical viewpoint to get the message across but where appropriate we do it with other bodies depending on what the message is either on a bilateral basis, let us say with the Institute of Physics or the Institute of Biology, or indeed the Royal Society and the Royal Academy of Engineering, or on a multilateral basis. It depends what is appropriate, what particular message one is trying to get across. I think what you should not go away with is the impression that the various institutions, the various learned societies and others do not talk to each other, they do.

207. In that respect, what role do you think Copus has to play and do you think it is fulfilling that role?

(*Dr Giachardi*) I think Copus was set up some time ago when the need was first recognised. It is probably appropriate to revisit it and think whether the duties it had at the time have been fulfilled and it should move on, and I would leave that to others to judge. I think the attitude I would take is when it was first set up it was "Copus" with a 'u', understanding. One of the great problems with scientists unless they have gone down a different role in life, a bit like I have, is they have a linear understanding of how science develops and that is not necessarily what the public wants to know. I would use the word "appreciation" or some word like that, why the world in which we live is better because of the activities of science. That does not mean you need to understand quantum theory.

208. Thank you. Can I just draw you on an issue that was raised earlier because I have a particular interest in accommodation. Would you not agree with me that the rent-free accommodation that you receive is core funding by another name?

(*Dr Giachardi*) I am not sure that I would agree with that but if that is the perception you want to put on it, so be it. What I would say is however you put it up, it does not compromise our independence. If it were not rent-free it would be down to the landlord to do the refurbishment that we have done at our own cost.

Chairman

209. Let me follow that up. I am sure somebody in this Committee would have asked if they were able but it is rumoured that there are chemistry departments closing in this country despite the influx of money into the sciences that the Government has made available. Have you spoken out against this publicly?

(*Dr Giachardi*) Yes. I have written to *The Times*, although sadly it did not get published. It is a very mixed message. We are concerned about the closure of departments but it is also the case that we need to think about how many high quality departments this country can maintain because there is no point in having departments unless they are high quality and that is a very real issue. Undergraduate numbers over the last five years or so have gone down by about 25, 26 per cent although they are higher now than they were in the 1970s. The issue that we face is that at A level numbers have gone up surprisingly, and I will explain why I say surprisingly in a second, but that is not feeding through into undergraduate numbers because a lot of people are reading chemistry at A level in order to study medicine and topics like that. The problem we have at A level, although the numbers are going up slightly, is that A level chemistry, and for that matter physics, is a grade to two grades harder than some other subjects, certainly liberal arts subjects, and if you go to an institute of education you will get them to confirm that analytically and unfortunately the kids know that anecdotally. That is a real problem for us.

210. You do not think—you can probably see my question coming now—that you are compromised in some way in speaking out against Government either because that is not your style to do that, you act in a different manner, or else you feel compromised by this rent-free tied cottage that you have got in part of London?

(*Dr Giachardi*) No, we will say what we think. We do not feel compromised by that. We have been quite robust in all sorts of areas on this. That having been said, it may be the case that there needs to be some concentration of chemistry departments. The danger that we must not fall into, and it is very frequently said by commentators both in this place and in the media, is that the country needs X numbers of

[**Chairman** *Cont*]

graduates or X number of PhDs. That treats the study of chemistry as a purely vocational discipline and that is an attitude I do not take. Chemistry is very interesting for its own sake and if somebody, for example, reads a chemistry degree at one of the better universities in the country, gets a First and goes off into the City, is that a waste? I think the answer is no. Why do I say that, because it is somebody getting into a position of influence who actually has a scientific background. When I say science, that could include engineering. We have a population out there which is illiterate/hostile to science and engineering and the more people we can get out there who have gone through the mill, even if they are doing something completely different in the city, in Government, in whatever, the better.

Mr Heath

211. You say that you spend £1 million a year in support of teaching in schools, what form does that take, what are you actually doing?

(*Dr Giachardi*) It is a variety of things and I will ask Mrs Steele to comment in a second because she is very close to it. We spend that amount of money developing curriculum material. We mentioned in the paper CPD support. There is a variety of things that we publish. There are some things in the pack, including a document such as this, which is also in the pack, which goes to all secondary schools in the country ten times a year I think it is. There is a whole variety of other things which we feel we are well placed to do because we can bring together lots of volunteer support which in many other circumstances it is easier for us to do than many other people because we have some very good networks of people. Every year we have a teacher fellow who is on secondment from his or her school on a sort of sabbatical and we pay them typically to write some curriculum material, do some work like that, and that is then frequently distributed free. Could I perhaps ask Mrs Steele to comment.

(*Mrs Steele*) We have a whole host of activities that we do for education. When I talk about education I think I would extend it from five to 65 going right through to our professional members. In terms of the initiatives for schools, as Dr Giachardi has already alluded to, we have curriculum support materials for the teachers which also aids the actual pupils. We also do a lot of continuing of professional advancement for teachers in terms of taking them on industry study tours, there are summer schools that run covering a whole range of things, particularly things like new chemical techniques, they get up to speed on things they may not even have covered in their own degrees. We produce a whole host of career materials which again we do try to do collaboratively with other organisations as and when appropriate. We attend careers events to give further advice. We have an excellent website, which again we try to enhance for students. At the moment it gives a lot of good information for teachers and we hope to enhance that for students' use as well. We not only support teachers in schools and colleges but also in higher education and, again, we support the lecturers as well the students and we produce materials for postgraduate students. We are currently producing materials for undergraduate students. We run workshops to help lecturers to keep them up to date. We have a range of initiatives. For our professional members the education continues and we have things like analytical chemistry by open learning, we have developed courses in that area. We are working with SEEDA, the regional development agency, on a biopharm skills course that is going to be made available this year. We are trying to get funding at the moment to develop another analytical science degree by open learning which has associated CPD courses. We have a range of things going from five to 65.

212. That is admirable but the school curriculum is still stuck with the flame test and titration, is it not?

(*Mrs Steele*) And we are working very hard in that area. We have already tried to make some changes and have succeeded. The way that we have done that is by seeing where there is a need to change the curriculum, such as putting in new chemical techniques so students are aware of what is happening in industry and research at the moment. We have done that by first of all producing the materials, training the teachers and then working with the appropriate agency, QCA etc., to get the curriculum changed. We have found that it is much more successful producing the materials and the training before asking to get things changed within the curriculum. We are currently working with QCA on Key Stage 3, changes to that. We have had significant input at all levels. We answer consultation documents regularly. In fact, I just finished one for QAA this morning. We do have significant input to all government departments.

Chairman

213. Thank you very much. Sadly we have to come to an end but can I just say we do look forward to the Links Day that you are running in Parliament and I am sure it will be well supported. It has a strong tradition in developing science among the political community in this Palace of ours. Thank you very much for that work and for coming here today.

(*Dr Giachardi*) Can I say thank you very much, we are also looking forward to Links Day. We greatly value the Links Scheme and the two-way communication we have and we greatly appreciate the opportunity to talk to this Committee.

Chairman: Thank you.

Examination of Witnesses

DR PETER BRIGGS, Chief Executive, and DR ROLAND JACKSON, incoming Chief Executive, British Association for the Advancement of Science; DAME BRIDGET OGILVIE, Chair, and PROFESSOR IAN HALLIDAY, Council Member, Copus, examined.

Chairman

214. Welcome to the last session this afternoon. Thank you for coming from the British Association for the Advancement of Science and thank you for coming from Copus. We have Dame Bridget Ogilvie, Peter Briggs, Roland Jackson and Ian Halliday, of course. Some of you, of course, are great friends of Parliament and participate in many ways in fighting for science in this nation of ours. Thank you for taking the time to come. Let me start off by asking you a question about Copus, which we know the history of and so on. We were astonished to see, as reported, that you have resigned and there is a letter which seems to be floating about everywhere. I wonder if you could put us in a position where we can ask about Copus by telling us what the situation is there. You are very welcome to make any statement you like here in front of us.

(*Dame Bridget Ogilvie*) Thank you very much, Chairman. Can I first say I am very delighted that Ian Halliday came here with me because he is a great supporter of the planned redevelopment of Copus. I understand your principal concern is whether we are using Government money well and the money for Copus comes directly or indirectly from OST and of course it provides a lot of monies for the Research Councils for similar and related activities. Ian is very supportive of this. Copus has a very distinguished history and is highly regarded nationally and internationally. Of course, I knew a lot about it from the days when I was at the Wellcome Trust developing the Wellcome Trust programme in public engagement around themes related to medical research in that case. Copus was very effective, I would say, from the time it was founded in about 1985 until, in fact, the Research Councils were mandated to engage in science communication activities in the reorganisation in 1993. I think that was the time when the real explosion of interest in engaging in this science communication activity began to become all pervasive in the scientific community: the Research Councils and the medical research charities, a huge change in the museums, the science museums, who have professionalised their activity to a stronger degree in the last ten years, and I have seen that as a Trustee of the Science Museum and then, of course, this massive explosion in science centres. This has all meant, together with the courses that are now running in many universities to train people in science communication, there has been an absolute explosion that has gone on in these activities, Copus did not change very much in reflecting that. I think most people who were not engaged with Copus recognised that from about 1993/94 on Copus had become swamped really by the proliferation of activities elsewhere and the vastly greater sums of money that are now spent in this area from a variety of different sources. Of course, industry itself through its various activities has become very much more professional about dealing with the public, which they have to do because their bottom line is affected by it. I think the three industrial groups, I would suggest, that have become very expert on this are Unilever, BP and I saw it at first hand at Zeneca. There is an enormous amount of expertise now in this. When I was invited nearly four years ago to chair Copus I recognised that Copus had lost its way. I do not know if the three owners of Copus have ever really realised that. After two years I persuaded them that it would be a good idea to try and find a new niche for Copus to become a kind of umbrella body, a body which would not do but would try and identify gaps, try and get people to work together, to try to get this enormous, increasingly expert group of people to work together, to share experiences and to generally provide a purpose. This intention was endorsed by David Sainsbury, Lord Sainsbury, when he came to the Copus Council meeting in autumn 1998 and then, of course, the House of Lords Committee under Lord Patrick Jenkin recommended that the Office of Science and Technology should look favourably at the new Copus and provide it with more resource if it should ask for it, but nothing much has happened. We set up the new council nearly two years ago and the staff we have is the same number of staff that has always been in Copus and they have been doing a very good job, an excellent job, in maintaining and developing the old agenda: the grant schemes which are funded by, your money, OST money, the Science Book Prize, which is an excellent and very satisfactory scheme, is now being funded by Aventis and we have had to reorganise that, and the science communication annual get together which we do jointly with the British Association, has been remodelled and the last meeting held just a couple of weeks ago was a great success because it brought together many of these players who are now increasingly professional and good at developing a dialogue with the public. The Royal Society runs Copus and it has not responded to the invitation to apply to the OST for core funding for Copus's new form. After much discussion we had a report as to how we should relate to the Royal Society in the future as its home institution and that has not been instituted. I have many demands on my time, I am passionately interested in this endeavour, but I decided there was nothing much more I could do, I had done what I could, so I decided I would resign at the end of June after the Annual Science Prize because I do not wish to be discourteous to our major funders, Aventis.

215. Thank you very much indeed for that explanation. I wonder if we could ask you one or two follow-up questions. One would be why did the Royal Society not take up this programme which seems eminently sensible and make sure that you have not got ten bodies doing what one could effectively do I guess? After all, if the Cancer Research Campaign and the Imperial Cancer Research Fund can merge when they told this Committee once that Omo and Daz did not mix, but

[**Chairman** *Cont*]

they got together and did it and they both came to this Committee and said it is the best thing that had happened for years, why would the Royal Society not take up that model which you proposed?

(*Dame Bridget Ogilvie*) I simply do not know.

216. Did you ask?

(*Dame Bridget Ogilvie*) Yes. I have been having quite a lot of rather interesting discussions with them and I do not think they felt there was any urgency about the matter. In fact, there are two committees that have run Copus. There is the Grants Committee, which is chaired by a fellow of the Royal Society, which is quite separate from the Copus Council. Its activities are reported to the Copus Council and I know that is the activity which the Royal Society regards as the major activity of Copus, to give away the grants. It is an important activity but in the current scene Copus grants are not a major activity in my view.

217. Do you think Copus will degenerate and disappear because they will not play ball with the other organisations?

(*Dame Bridget Ogilvie*) Copus does not belong to me or anybody else so I do not know. What I would like to emphasise is that I feel very strongly that we need a strategic body and what it is called I do not really mind. Many people are very concerned about names. Copus is a very distinguished name and it would be very nice if the new umbrella body was called Copus but I do not think it really matters what it is called. I think you should judge organisations by what they do rather than what they are called. If the people who own the brand name Copus do not want to engage in this new activity well so be it, let us start something else and call it something else.

218. You and I have been at many meetings together over the last few years when we have seen the debates over GM and MMR and all these issues fall about and there is a lack of focus. Do you think the failure of Copus to be that umbrella organisation has had any impact at all on the public perception of science or anti-science feelings that have been generated we have been told?

(*Dame Bridget Ogilvie*) I do not think Copus is a brand name in the community that you are talking about, the public. It is a brand name, and a very distinguished brand name, in the core inner group of people who are really interested in this. I think what has really changed is society itself. We do not live any more in a deferential society, the public is extremely sceptical of anybody in authority. No matter how we were organised I do not think we would find it very easy to deal with some of these key issues. As a matter of fact, I think the most positive thing I have done while I have been chairing Copus is to engage the industry representatives in the activities of Copus and they are very good at it. For example, Unilever works very well with the NGOs, they realise that a lot of things the public are saying are latent fears, they do not really want more information, they want to know if they can trust scientists. It is a question of trust and we all need to work to show ourselves as trustworthy. In the recent meeting that we had with the BA we got together a number of people who are increasingly good at this dialogue, whether they are the Research Defence Society, which is constantly dealing with the matter of animal research, a very sensitive issue as we all know, or the medical research charities who are very good at dealing with this because they have patient power and the patients can explain to people very well why they think medical research should be continued in various sensitive areas and so on and so forth. There are plenty of bodies now who are becoming very, very expert at dialogue with the public in particular fields of science and this is why I think it is very useful if you can get these bodies to get together, to talk together, to share expertise. What the umbrella body is called I do not think matters in the slightest.

Dr Iddon

219. I would just like to carry on this vein of questioning for a little while, Dame Bridget. I think you have already answered this in a way but I would like to ask you who carried out the review of Copus in 2001 that recommended that it be "reconfigured"? I think you said that was yourself, is that correct?

(*Dame Bridget Ogilvie*) We had an expert outside organisation who do this sort of thing as a matter of course. I cannot remember the name of it, I can let you know.

220. Okay. It was then taken to your council and the council finally agreed that.

(*Dame Bridget Ogilvie*) Yes.

221. It seems as though your position within the Royal Society at the moment is leading to the difficulties. You are housed in Carlton House Terrace, the principal funding comes from the Royal Society. Is it the lack of independence that has led to the present difficulties and would it not be better if you moved out of the Royal Society building and became completely independent of the Royal Society apart from perhaps some grant funding from them?

(*Dame Bridget Ogilvie*) I think that if you have an umbrella body then it has to be a gathering of equals and has to be seen to be independent of any one body. My model for this is the Association of Medical Research Charities, which I was involved with from the day of its founding, and that is a very similar kind of thing in the sense that it has enormous bodies, such as the Wellcome Trust and Cancer Research UK, involved and then many tiny members, it has 100 members. It is set up independently. It started very gently because you have to get people to buy in. You have to have an agenda which everybody agrees. You have to take it slowly and earn trust, and that is exactly what happened with the Association of Medical Research Charities and it is not housed with one of the member organisations. It was initially housed in the Wellcome Trust but it very quickly moved out simply because we felt it was essential that once it had got on its very early feet it should be seen to be independent. I do not think it is necessarily anything particularly to do with its physical presence in the Royal Society, rather the way in which the Royal Society exerts control.

222. Thank you. Moving on, could you perhaps tell us what you think Copus's main successes have been and also its failures? I think you have mentioned some of the latter.

[Dr Iddon *Cont*]

(*Dame Bridget Ogilvie*) There is no question that in the early days it really sharply drew to the attention of the scientific community the need to engage. It reminded them, I guess, that most scientists get their money from Government ie from the public. I do not think we should insist that all scientists should engage in this but they should see to it that the work they do is drawn to the attention of the public. The fact of the matter is 90 per cent or more of the science that goes on the public are very supportive of, there are just certain key issues which people are concerned about. Also, the other thing that has happened is that science moves so fast now and it is so powerful. I do not think it is the slightest bit surprising that some aspects of science people are concerned about, 'twas ever thus after all. In the very earliest days of steam engines they expected to go along with a little man in front with a red flag. Nothing has changed in that way, just some important issues which people are—

223. What has Copus got that none of the other scientific organisations have got? What is special about Copus?

(*Dame Bridget Ogilvie*) I think in the early days it was special because it was owned jointly by the three bodies which traditionally over a long period of time had engaged in this sort of activity, particularly the British Association, which of course is very distinguished and has a very excellent history and track record right up to the present day in this, the Royal Institution which was very important, particularly in the London area, and the Royal Society because it represents the best science in the country and knows how to get access to the world science. It was entirely appropriate that should be the initial situation, but as I say it was the explosion of activities in the early 1990s which meant that Copus did not grow to match that.

224. So you are saying one of your main strengths has been partnership?

(*Dame Bridget Ogilvie*) Yes.

225. Have you any advice to give to your successor?

(*Dame Bridget Ogilvie*) I would simply say that I think the objective that we tried to achieve for Copus to become I believe is a very important objective, trying to maximise what is going on by seeing where the gaps are, getting people to work together when it is necessary but not actually doing much itself, not to take away from others, that was never the intention.

226. Could I now look at funding. Can you give us a breakdown of the Copus accounts?

(*Dame Bridget Ogilvie*) The Royal Society is responsible for that. We can give it to you of course.

Dr Iddon: That would be helpful.

Chairman: That would be easier, we will get it that way.

Dr Iddon

227. I take it from that response that the Royal Society audit and manage the funding and get the accounts audited as well and they are in full control?

(*Dame Bridget Ogilvie*) Complete control. I have never seen a real budget.

228. Why is the Royal Society so dominant in the control when you have mentioned the British Association and the Royal Institution? I have just referred to one of your strengths as partnership but it seems the Royal Society is dominating events too much.

(*Dame Bridget Ogilvie*) Perhaps you could ask my colleagues from the British Association.

Chairman

229. I am sorry but you can understand how serious we take this situation. When an eminent person like Dame Bridget resigns from an organisation something is going on that needs probing.

(*Dr Briggs*) We are very happy to join in on this discussion when you would like us to.

(*Dame Bridget Ogilvie*) Perhaps you could answer that question.

(*Dr Briggs*) I think it was seen as best in the past when it was three organisations effectively working together in partnership. I think the difficulty has been how to find the most effective way of getting a larger number or organisations working together in partnership. When it was three organisations in effect the Royal Society always played two roles. It was a partner body in the sense that the three partners ran activities and it was also, and always has been, the channel of funding for Copus, either funds that came direct from the OST to supplement the grant scheme or funds through the Royal Society grant in aid for Copus activities. In a sense the financial arrangements of Copus have always been channelled through the Royal Society. The partnership issue has always been about delivering the activities and making the thing work.

230. Would you be looking at perhaps rechannelling that funding, perhaps directly, from the Office of Science and Technology?

(*Dr Briggs*) I think the first thing to do is to be absolutely clear what it is Copus ought to do. It seems to me there is a very clear emerging consensus about what Copus ought to be about and then the question is what is the model on which it operates, how much funding does it need and where that comes from. When people talk about Copus being independent one of our concerns would be there is a very big community of organisations now concerned with science communication, maybe there is 100, I do not know what the number is, and what we do not want simply is for Copus to be the 101st, somehow it has to be different than that. It has to be an organisation about which we all have a sense of ownership and in which we all have a stake. Once that is sorted and it can be clearly defined in some sense, I do not think it matters where the money comes from provided that it is clearly defined as Copus money and Copus, however it is manifested, has the ability to manage its own funds. I think you can see a variety of models by which that might work.

231. In any organisation somebody has to determine the programme, the business plan, they have to cost it and then make the bid. Who does that in the case of Copus? Is it the Royal Society, is it

[**Chairman** *Cont*]

Copus itself or is it a partnership? Who makes the bid for funds? Who determines your budget in other words?

(*Dr Briggs*) I think it has changed in the last few years. Copus has gone through a period of relative inactivity where a number of pre-existing activities that Dame Bridget has already spoken about have been maintained. Some have been delivered by Copus staff. I think Copus has worked best when, for example, Dame Bridget referred to the Science Communicators' Conference that we held a couple of weeks ago which the BA organised in co-operation with Copus. That means we have a means of operating where we are not in competition with each other, we are achieving collective objectives and working together. In the past when we were clear about what was happening the Royal Society staff, and this is in the past scenario when organisations contributed staff to work for Copus rather than their being dedicated Copus staff, put together the budget, managed the budget and it was allocated to them.

Chairman

232. Are the Royal Society slow in decision making or just a bunch of control freaks, in your opinion?

(*Dr Briggs*) I have no idea.

233. That would be one hypothesis. That would be how we would look at other organisations that we deal with if this was the result.

(*Dr Briggs*) The British Association receives funding from the Royal Society and that certainly would not be true in that case.

Mr Heath

234. The stakeholders, to use a term that you used earlier, seem remarkably incurious about Copus, how it operates and what its future is.

(*Dr Briggs*) Remarkably incurious?

235. Yes. There seems to be no interest from the people who are identified as stakeholders in any of what is happening.

(*Professor Halliday*) Can I make an interjection there. There is a technical point which is Copus is legally speaking a Committee of the Royal Society so the accounting officer chain is through the Secretary of the Royal Society, who is sitting at the rear of the room. There is a technical question about legal responsibility. Given Lord Jenkin's report, given what Lord Sainsbury said at the beginning, there was a real strong belief that there would be a large measure of independence for Copus as an independent committee to be able to make its mind up and how it would bring knowledge about what the Research Councils' interests were and others would bring other interests. It has been extremely frustrating that we have not delivered on that agenda. It has been known for some time at a level of talk that there has been money in OST and there is a strong consensus inside the committee about the kind of agenda that is very much defined by the Science in Society Report about what Copus should be and the statement that it should not be the 101st funder of a small grant scheme is taken for granted in the Copus Council. It is that tension, the tension between the Royal Society as accounting officer, legal chain of command, and this desire for strategic view independence on the part of the committee members that is basically hamstringing the operation.

236. But that desire is presumably shared by the Government as effectively the funder and as a Government which has set aside money for this specific purpose which has not been drawn down. Does the Government not have a view on this? Has it not expressed any view on why money is sitting in the OST account not being drawn down? Has the Minister not made any observations to the Royal Society?

(*Professor Halliday*) The Minister has made, I believe, a very strong statement that he would like this independent strategic view from Copus.

237. Initially?

(*Professor Halliday*) Initially.

238. But since then nothing has happened.

(*Professor Halliday*) Effectively.

(*Dame Bridget Ogilvie*) Effectively.

Chairman

239. What has happened is the Royal Society has walked all over you, has it not? That is the Jeremy Paxman question. They have walked all over you and you have found it very difficult to resist them.

(*Dame Bridget Ogilvie*) I do not think that is entirely fair. Copus does belong to three organisations. I do not think it is a formal brand name in the sense of having a patent lawyer involved but it does belong to them. If they do not wish to have it evolve in this way that is their affair. Why do we have to call it Copus, we can just call it something else? I find this hang-up about the name really extraordinary, I like to do things.

240. It is an organisation that sought independence and had an important message and tried to move things forward for the good of British science.

(*Dame Bridget Ogilvie*) I had many discussions with OST because it shared my frustration but they kept saying they had to have the accounting officer applying for the money.

(*Dr Briggs*) Chairman, I think we all share some responsibility for this. All of us have sat round the Copus table and you cannot just sit round the table and not accept some responsibility. It seems to me the very important thing now is to make sure we get it right and sorted quickly, we cannot go through another two year period messing about. I think the will is there now to make that happen.

241. Let me ask Ian Halliday about helping understand money in the Research Councils. How much is involved in all that? I once heard John Lawton say he had a million pounds and he did not know what had been done with it for public understanding in the NERC. I remember it well.

(*Professor Halliday*) In PPARC at the moment we spend about £800,000 a year. It is about to go up to a million. That runs a variety of things. Let me go back to the beginning of PPARC. There was a long

[Chairman *Cont*]

discussion in council about just which parts of the public understanding agenda, as it was then called, that PPARC should attempt to influence. One of them was very much the agenda that you heard the Royal Society of Chemistry talk about which is how do you interest school kids, how do you keep them involved, etc. We run a small grant scheme that is very much taken up by people in schools, interest in astronomy, particle physics, whatever, to motivate school kids. That is just over £200,000. We spend about £400,000, if you like, inside the office producing glossy material, trying to influence journalists, trying to get the material into the public domain as part of our science. We tell all our grant holders that they can use up to one per cent of their grant to motivate—

242. It is sums of money I want. My question really is if all the Research Councils got one million each, why do we not just give it all to Copus and let them get on with it? Why do we not have one body doing it?

(*Professor Halliday*) I understand the speech.

243. You and I have been at a million dinners where the same people say the same things and it gets boring after a while.

(*Professor Halliday*) Let me make some provocative statements. In the context of astronomy and particle physics I think we are better than Copus because we know more about the people, we know more about the school teachers, we are more targeted. Not that we are better as an absolute but we know the market better and so on. Across the Research Councils questions have been asked by David Sainsbury and John Taylor over the past year, 18 months. The number quoted is usually five to eight million across the Research Councils and OST, the number seems to fluctuate a bit depending on what precisely you include. The question is what is that achieving. A more provocative question would be what would you achieve if you gave that money to Saatchi and Saatchi and said "change the British attitude to X", whatever X happened to be. That is the kind of question that I believe Copus should take on board and think about, not in a prescriptive way but to stand above the fray and take a strategic view of what are the questions, what are the challenges, is the current mix of a thousand small schemes the correct mix? I do not know. The problem is if you try and measure our impact on high school teaching of physics the effect is almost unmeasurable. We have a small number of fantastically enthusiastic teachers who we help to be enthusiastic and they ask us for the material, we do not send it blind, but there are a thousand and one other school teachers who never pick it up.

Dr Iddon: We are getting very frustrated around this table, I am sure, all of us. It is pretty obvious that something has gone wrong here. Why does this partnership not widen to include not only the three organisations which rightly funded Copus in the first place and got it off the ground but to the Science Councils as well or anyone else that is involved in the public understanding of science.

Chairman: That is what Dame Bridget wanted really.

Dr Iddon

244. Why can we not put this to the top of the agenda and lift it off?

(*Professor Halliday*) That is a correct question and given the frustration around the table at Copus that is what we would like to do. There is the brand name of Copus which has a certain history and one should not forget that 12, 15 years ago nobody was doing this.

245. We have admired it. I have admired it.

(*Dame Bridget Ogilvie*) Absolutely, we all did.

(*Professor Halliday*) I think you should get OST to speak for themselves. They are aware of these problems, they are aware of these views and solutions, whatever, are being talked about but the solutions are not in the public domain, they are not agreed, they are not decided. They are aware of the problem.

Chairman: Let us bring the level of frustration down and ask Andrew to relate to something else. We may come back to this question.

Dr Murrison

246. Can I ask Dr Briggs about NESTA that funds you partly.

(*Dr Briggs*) In so far as NESTA is the managing agent for Science Year, and it has funds from the DfES to manage Science Year and we have been a strategic partner in Science Year, yes, we have had money from NESTA.

247. According to your accounts Science Year cost £186,103 last year.

(*Dr Briggs*) Yes, which we got through NESTA.

248. You got £176,000 from it but it was largely funded by NESTA, I accept that. In your evidence you say that the total you received from NESTA was £500,000.

(*Dr Briggs*) That is the total that we are getting for our contribution to Science Year. It crosses more than one financial year. In the financial year for which you have got the accounts we had the £170,000-odd, the remainder will come in the next financial year.

249. Thank you. NESTA is more or less funding in totality Science Year for a period of time, is that right?

(*Dr Briggs*) NESTA has been given a major grant by the DfES as the manager, as it were, of Science Year and it is subcontracting to various organisations, of which we are one.

250. Moving to something completely different but related, you are moving to some new accommodation I understand, is that right?

(*Dr Briggs*) We are.

[**Dr Murrison** *Cont*]

251. I wonder if you could tell us a little bit about that.

(*Dr Briggs*) Perhaps Roland Jackson, who is going to be my successor as Chief Executive, can answer that since the new accommodation is in the Science Museum and Roland is currently acting Head of the Science Museum, can answer that as he is probably better placed to answer that question than I am.

(*Dr Jackson*) It is very convenient but it is not a fix, I assure you. At least I do not think it is! The Science Museum is building a new building, the Wellcome Wolfson Building, at the back of the existing estate on the museum which is funded very generously by the Wellcome Trust, by the Dana Foundation, by the Wolfson Trust and the Garfield Weston Foundation. Part of the whole package, if you like, for that funding is that the BA will occupy one floor of that building as accommodation for its offices in the middle of next year.

252. It will be rent-free?

(*Dr Jackson*) It will be.

253. Do you think that is right?

(*Dr Jackson*) I am very glad that it is. The money is not coming from the Government. In fact, you could say that the BA is effectively moving out of Government funded rent-free accommodation into accommodation that is funded by a separate body. Having said that, I do not have any problem with accepting Government money on various commissions, and you might want to press me on that in a moment.

254. Is the accommodation guaranteed or is on a wing and a prayer?

(*Dr Briggs*) Can I just answer that. There is an agreement between the BA and the Science Museum that we will have accommodation at peppercorn rent for 40 years. That is a condition of the Wellcome Trust grant towards the cost of the building.

255. So it is really the Wellcome Trust effectively providing this benefit, would that be correct, with the intermediate Science Museum?

(*Dr Briggs*) The Wellcome Trust agreed to fund the building on the condition that the BA could occupy space in it.

256. That is jolly decent of them.

(*Dr Briggs*) Yes, it is. Wellcome Trust think a lot of us.

Mr Heath: I want to come back to the effectiveness of everything that is being done, I suppose in the first place because the Association has been in the game for longer than most. My impression is that we are in this country moving towards a sort of new medievalism in a lot of ways in our approach to science.

Chairman: It is a new Liberal Party policy.

Mr Heath

257. We see an objection, not just general antipathies towards science but an objection, to scientific principles and methods and embracing this populist culture within the magazine world where replacing a potted plant in one place or another is going to change the world or whatever. Obviously it is not working, all the efforts are perhaps aimed at the wrong audience, so what can be done better?

(*Dr Briggs*) Can I just challenge your assumption in the first place. If you go back to the House of Lords' report and you look at all public opinion surveys about science there is massive public interest in science. I agree that there is some sort of dichotomy but if you go look at the MORI polls and other polls, all you get are very positive responses to science. There is some evidence maybe that people's trust in scientists and in various branches of science, especially perhaps if it is related to industry and to Government, is not what it once was. I think it is not obvious that what you say is true. I also think there is a dichotomy between asking questions about science in general and the ways in which these things manifest themselves in people's everyday lives which tend to be not science but GM or BSE or whatever it is.

258. I want to challenge that because there is a proper scientific basis for questioning authorities, whether they are scientific authorities or industrial concerns with their own agendas, and that is quite proper and that is what I would like people in this country to be able to do, to understand risk assessment, to be able to challenge the assumptions, but there is also a prevailing mood it seems to me which is based on nothing to do with the various bodies which are charged with the understanding of science which is rejecting medicine, rejecting biotechnology, rejecting all that and saying instead "there is something else which is more attractive to us because it says so and here is the Sunday supplement I have read" and it is not being challenged.

(*Dr Briggs*) It seems to me that a scientific approach is to ask what public opinion is and it does not necessarily support the view you are taking there. Nonetheless, I agree and it seems to me that one of the lessons that we have all learned, in part because of the Science in Society Report, is that the way in which we interact with the public has to change and pontification, as it were, which has probably been the characteristic method in the past, has to give way to two-way communication which means listening as well as talking. I think we have all got a lot to learn in how to do that effectively. The Dana Centre in the new Wellcome Wolfson Building, is going to be dedicated to exploring what dialogue, two-way communication might mean in practice for a range of audiences. I do not think you can change all that overnight. I think we are all beginning to look at different ways in which we interface with the public but at the same time you also have to recognise the impact of the media. If you take, for example, one of the activities that the BA co-ordinates nationally, the National Science Week, we get about one and a half million people directly engaged in activities that week. The Science Museum, until it got free admission, had about one and a half million visitors, now it is more. That many people read the *Daily Telegraph* every day or a third of that number watch a television programme. We always need to think about what enormous sized impact the media has. It is not just our efforts, it is whether the other means in which the public are communicated to and with are playing the game or not.

[**Mr Heath** *Cont*]

259. It is self-selecting groups, is it not, that are going to go to the museum or are going to be involved in Science Week?

(*Dr Jackson*) That is absolutely true but you can change the self-selection criteria and that is what we need to do to engage a much wider variety of people in things that actually matter to them because you have to start from where they are. Perhaps a trivial example in the context of this is our current exhibition in the museum which is called Grossology which is the science of the gross bits of your body and we are absolutely packing people in, and the sort of people who would not normally come to the museum and do not normally come. If you can find those hooks that engage with where people actually are then you have got a route in.

260. I have got an 11 year old boy who would be very interested in that.

(*Dame Bridget Ogilvie*) I do not think it is just science that has had this trouble. If you had listened to the Reith Lectures this year and Onora O'Neill, we are in difficulties with science but we are in difficulties generally because of the amount of scepticism. I think we could argue that if we had not all got much more active in trying to engage with the public we would be in an even worse situation.

Mr Heath: My worry is not scepticism actually it is the rise of superstition.

Chairman: I do not really want to get into a discussion about the philosophy of public understanding, we are examining learned societies and we should probe how they work.

Mr Heath

261. That is why I want to ask now, if I may, given that you have obviously considered this issue and how you best approach it, would it not have been better to have increased funding and put it into an organisation such as your own, which is well established, and widen the scope of what you are able to do rather than have it dissipated amongst a lot of bodies all doing their own thing in their own little way and speaking to their own little audiences?

(*Dr Briggs*) I think there is a balance to be made in that. I do think critical mass is quite important. If I may go back to the earlier question to Ian about that, it seems to me that the BA and Copus, as it were, stand alongside each other. We are an activity led organisation. Copus wants to be a strategy led organisation. I think we deserve the six million and not Copus because I do not think you need the six million to do the strategy. I do think there is a point of generating some critical mass. Also I think variety is a good thing. You can get too many small initiatives but a range of ways of tackling this problem is not to be spurned.

262. And the learned societies fit into your framework how?

(*Dr Briggs*) In the BA framework at the moment, we have 120 institutional affiliates, universities, learned societies, museums, science centres and so on, so we see ourselves potentially as a body which in an activity way can sit at the heart of the science communication community.

Mr Dhanda

263. Just going back to Dr Murrison's line of questioning. Quite a few of the organisations that have sat round this table today have talked about their independence and not having any Government money at all. Is that not something that you would benefit from yourselves?

(*Dr Jackson*) Can I answer that since I take over in September and the BA is currently in receipt of substantial Government funding, and it is actually critical to us at the present time. I would say an organisation like the BA, because it is totally cross-disciplinary, science, engineering, social sciences, it is national in the sense that it has regional local branches, needs as many stakeholders as it can get, if you like, and as far as I am concerned the more stakeholders we have the better. We have lots of institutional affiliates, we have lots of corporate members, we have lots of individual members. I think the Government as a stakeholder for us, and through that, if you like, the wider public taxpayer, is something that will make us really think about what the country as a whole actually needs in terms of its engagement with science. I am delighted in that respect.

264. How independent does that make you?

(*Dr Jackson*) That depends on the terms on which the grant is given and we are ready to refuse a grant if we do not agree with the terms.

265. You have refused grants?

(*Dr Briggs*) No, we have never refused. We have said what we want to do, what we think our milestones ought to be and we have been given grants on that basis. So far we have got no sense that our independence is in any way compromised. In any case, I do not think it is any more compromised by getting Government money than it is by getting anybody else's money. We depend for 85 per cent of our income on grants. It is more compromised by a Research Council giving money when you can only spend it on particle physics in a way than it is by Government which says "here you are, you get on with the general job and we will support you".

Mr Dhanda: Thank you for your comments.

Chairman

266. I make no apologies that we have gone well over time because I think, Dame Bridget, your resignation knocks British science back somewhat. I think taking time to examine that for the organisation of public understanding of British science in this country was very important. Can I really press you. You did say that they at the Royal Society had obstructed your plans for change. Why and who?

(*Dame Bridget Ogilvie*) I am very sorry if you really think it has set back the course of British science. I do not think it has because I think the sort of thing we are talking about is very much an inner thing with those of us who have a particularly close concern with this aspect of science. I do not think the rest of the world thinks that Copus matters. In fact, many of my colleagues in science said "why are you troubling with Copus, it is only a peanut?" They could not understand why I was bothering. I just simply do not

[**Chairman** *Cont*]

understand why the Royal Society did not want Copus to evolve, I really do not know. I have no hidden agenda, I just do not know.

267. Do you think they are slower to see the world changing or do you think they are control freaks?

(*Dame Bridget Ogilvie*) I would rather you ask them directly rather than speculating. I have no idea. There is no hidden agenda, we just did not evolve. We set up a council and they had nothing to do.

268. Thank you very much. Is there anything else that anybody would like to say? Thank you very much indeed for taking the time, it has been very interesting. Our report will come out and hopefully it will be very positive for British science.

(*Dr Briggs*) We shall read it with interest.

Chairman: Thank you.

WEDNESDAY 19 JUNE 2002

Members present:

Dr Ian Gibson, in the Chair

Mr Parmjit Dhanda
Mr David Heath
Mr Mark Hoban
Dr Brian Iddon
Mr Tony McWalter
Geraldine Smith
Bob Spink
Dr Dennis Turner

Examination of Witnesses

Professor John Enderby, Vice President, and Mr Stephen Cox, Executive Secretary, The Royal Society, examined.

Chairman

269. Stephen Cox and John Enderby, welcome to this session. Thank you very much for making yourselves available at such short notice to help us in our inquiry, which you have already anticipated. You will have read the transcript of last week and you have heard certain criticisms levelled against the Society. How would you care to respond to them?

(*Mr Cox*) Thank you, Chairman. Perhaps I can give a bit of the background of Copus, which was set up following the Bodmer report back in the eighties, as the Committee for the Public Understanding of Science. It was a joint committee of the British Association (BA), the Royal Institution (RI), and the Royal Society (RS). I should add at this point that the BA and RI would have liked to have been with us, but I think the Committee felt they just wanted to see the Royal Society. Over the next decade or so, Copus promoted the better understanding of science by implementing the Bodmer report recommendations. It encouraged organisations and individuals to get involved in public understanding and established a series of activities: book prize meetings, seminars, grants, and programmes. At that time, and for much of its life, it had no dedicated staff. It drew upon the three sponsoring bodies of the RI, the Royal Society and the BA to provide the staffing. We provided the core secretariat and administered the grants from our staff from within the Royal Society. The BA ran the meetings and the seminars and the RI provided all sorts of support in kind. It was essentially a committee bringing together the three bodies to promote public understanding, but what was already clear when Dame Bridget took over from Lewis Wolpert in 1998, that Copus needed to change to reflect the very significantly changed environment in which it was having now to operate. I think we all agree that the environment had changed partly as a result of the work that Copus itself had done. The Committee was clear that it needed a new agenda and did indeed produce a new agenda for the period of 1997 to 2001, and this was under Lewis Wolpert's chairmanship. However, Dame Bridget felt that change needed to be more radical than that new agenda laid out, and we agreed. I do not think there was any dispute at all on this. We therefore instituted a series of consultations, trying to bring together various parties, and a new council was formed. The membership of the new council reflected very much the wishes of the chair, which was Dame Bridget. It brought in significant players in the biomedical field, so we had the Welcome Trust, the Association of Medical Research Charities, the Academy of Medical Sciences; and it brought in major funding bodies: the research councils and the major public science facilities, the museums and the science centres. We had to get some approval for this, so the new membership of the new Council was approved by the three councils, of the Royal Society, of the Royal Institution and the British Association. So far, so good. Again, there was not really very much dispute. In addition, the Royal Society recruited two new members of staff to be dedicated to Copus work, and the BA and the RI continued to provide support in kind. We now had a new council, and whereas before staff were simply drawn from the existing organisations, we had two dedicated staff to provide support for Copus. The new council met in May 2001 for the first time and has held four meetings so far. The crux of the issue, I suspect, is September 2001 when the Council considered the Jamieson report, entitled *Terms of Reference*. Discussion in Copus Council centred not on the first part of that report, but on the second part, on the corporate governance. The council agreed at its meeting in September 2001 that Copus should remain as an unincorporated body, hosted by the Royal Society; but the Copus council asked that a memorandum should be drawn up to clarify Copus's relationship with the Royal Society and also with the other sectors on the council. At that moment, the Royal Society initiated a series of consultations to see the nature of that memorandum. These consultations were primarily with the original partners, that is the BA, the RI and the Royal Society, and I offered to prepare a paper for the January council meeting. This offer was not acceptable to the Chair, and so that paper was not presented to the council in January 2002. At the 2002 meeting, the Royal Society was asked to produce a draft business plan for consideration at the May meeting, we did indeed prepare a draft, and that draft business plan was discussed at the May council meeting. The positive outcome of all this was that the May council meeting, though there was a lot of disagreement about what should be in the business plan—there was considerable engagement for the first time with the issues. Towards the end of that meeting, I felt that we were actually at last beginning to make progress, but at that point Dame Bridget

[**Chairman** *Cont*]

resigned. During the whole of this period, as a result of a great deal of hard work by the dedicated Copus staff, but also by staff in our three organisations—because the Royal Society staff generally continued to provide support for Copus—the work of Copus has continued uninterrupted. We have continued the grant scheme, the books prize, and the seminar programme. I asked for a leaflet to be put round the table as an example of the sort of thing that we believe not only Copus should do, but actually does extremely well. It shows the link between the British Association and Copus. The Royal Society is signally absent. It was part of Copus activity and not really much to do with the Royal Society. We have also changed the corporate identity, produced a separate website, produced a different e-mail system, generally pursued a re-branding exercise and continued with such things as the book prize. Again, today, there is a massive spread in this newspaper and the whole page is basically Copus. We hope that the *Guardian* will have a similar spread next Monday. It indicates the range of activities of Copus, which has continued.

270. That has put it in focus for us—thank you. Nevertheless, Dame Bridget did say: "When I was invited nearly four years ago to chair Corpus, I recognised that Copus had lost its way. I do not know if the three owners of Copus have ever really realised that." Do you think that is a fair comment?

(*Mr Cox*) I was not there either—Dame Bridget and I arrived at about the same time—so I looked back, and I felt that that was unfair because Copus had produced the new agenda and there was a recognition in the three organisations and in the Copus council that Copus needed to develop, and develop along particular lines. As I have indicated, Bridget thought this should have been more radical than it was; but nevertheless the scene was changing very rapidly at the time, and we were very happy to re-visit it when she took over as Chair.

271. Do you think Corpus achieved what was set out to be achieved when it started? If you had to rate its achievements on a 1 of one to 10, where would you put it?

(*Mr Cox*) I would put it, in its original brief, as 9 or 10. The change in the environment in which Copus came into being in 1984, and the circumstance we found ourselves in in the late nineties, were worlds apart. Newspapers now cover science extensively and they did not in 1984; every science organisation is involved in some way or another in public understanding or science communication, efforts and work. That demonstrates to me just how effective Copus has been in the past.

Geraldine Smith

272. Can you explain the status of Copus as a committee of the Royal Society, and can you tell me what legal implications that has for staffing, finance and policy issues?

(*Mr Cox*) The status of Copus is a committee of the three bodies, the Royal Society, the Royal Institution and the British Association. Copus is an unincorporated body, in other words has no legal identity. That matter was considered in the September 2001 council meeting, but it was decided that they did not wish to change that. That was a very clear decision by the Copus council. They wished to remain an unincorporated body. In relation to the status of staff, the Royal Society is the employer and employs the staff on behalf of Copus. The Royal Society supports Copus in the work that it does and provides the financial background and financial back-up.

273. What is the role of the grants committee?

(*Mr Cox*) It is there to allocate the Copus grants. It has no other role. It acts as, basically, a mini peer-review committee. I should not really use that term because they are not scientific proposals, but it acts as a review committee, looking at the proposals and allocating the grants according to the budget that OST lays down.

274. Since Copus was reconstituted in 2001, what has changed fundamentally?

(*Mr Cox*) The first is the newly reconstituted council itself. The second is dedicated staff, staff dedicated entirely to Copus work. The third is the wish on our part, and I think on OST's part, to see Copus extend and expand its activities in an agreed fashion. In terms of its focus, it has changed, as a policy issue, from promoting public understanding of science, to developing science communication. This is very much in tune with the view of the Select Committee of the House of Lords on the way in which the nature of science communication has changed over the past five or ten years.

275. What are the responsibilities of the Copus council?

(*Mr Cox*) Their responsibilities are to oversee the work of Copus and to prepare, produce and provide a new direction. That is probably the key, the new direction for Copus, in the new circumstances we find ourselves in, where Copus should be going in the next five years.

Mr Heath

276. You said that the legal status of Copus was as a committee of all three of the stakeholders because that is not the same information that Professor Halliday gave us the other day: he said that Copus is legally speaking a committee of the Royal Society.

(*Mr Cox*) I think my answer was correct. As an unincorporated body, it does not have a legal status. I am not a lawyer, but the view we have always taken is that it is a joint committee of the Royal Society, the Royal Institution and the British Association; and that is in all the documents.

(*Professor Enderby*) We get money from the OST, and therefore we have to have an accounting officer. That accounting officer is Mr Cox, who is employed by the Royal Society, so in that sense, and in that sense alone, the responsibility for the proper disbursement of public funds is the Royal Society's. That is quite different, if I might say so, from saying that Copus is a Royal Society committee.

Bob Spink

277. Mr Cox has quite eloquently explained how the structures of the business plan are being developed to meet the new needs and demands. Can you explain, Mr Cox, how Lord Jenkin's approach will differ from that of Dame Bridget?

(*Mr Cox*) I know that Lord Jenkin is looking to see whether he can offer advice to Copus council on the way forward, given the current situation. His approach is as a facilitator. He is not chairing Copus. He is not in any other position; he is an informal facilitator, and we are extremely grateful—he is probably sitting behind me and I think I had better say this, but I mean it: we are very grateful indeed to him for coming to our aid in trying to help resolve the issues.

Dr Iddon

278. Is this a fixed-term appointment or an indefinite appointment?

(*Mr Cox*) We would hope that it would certainly not be indefinite. We would be in terrible trouble if it were! There is not a specifically fixed-term; and we see it as short-term. I hope he will agree with me.

Mr Hoban

279. You say that Copus is an unincorporated body. Why did the Council decide it should remain so, and was this a universal view?

(*Mr Cox*) The recommendation of the report that Copus commissioned was that it should remain as an unincorporated body for between three and five years, and that then the situation should be reviewed. It was my recollection—and I am having to recall this because the minutes do not record dissent—that it was pretty well unanimous; the voices round the table were comfortable with that arrangement. I do not recall major dissension.

280. Can you outline why it is unincorporated as opposed to being any other kind of body?

(*Mr Cox*) It always has been. I realise that that is a silly answer, but because it always has been, it is; and, therefore, it was looked at to see whether that situation should be changed. The recommendation of the Jameson report was that it should not be changed, and that recommendation was accepted by Copus council.

281. You have referred to the committee of the three societies and you have reinforced that point in an earlier answer. Do the other two societies see it as being equally the responsibility of all three societies, or do you take the lead as the Royal Society?

(*Mr Cox*) "Yes" is the answer to both those questions. They do see it very much as part of their responsibility. I have sat through the BA council, discussing Copus, because I am on the BA council, and I know how much they value the link with Copus. Of course, the Royal Society has an additional financial responsibility for Copus and therefore there is an additional onus placed on the Royal Society in financial terms. However, in terms of the way the other bodies see it, it is very much integral to the work they do. As you can see, the British Association and Copus organised the recent seminar, not the Royal Society.

282. Putting finance to one side, you provide staff and you are the accounting officer for OST money. Do each of the three parties have an equal share of responsibility?

(*Mr Cox*) Yes. In the original Copus council, indeed they did. The make-up was designed to give each of the three partners equal status on the council. The current council is slightly less clear, and all of us—the three founding bodies—have two members, and then other bodies have one or two, depending on the sector.

283. Are members of the council clear as to who is responsible? It does sound like a very difficult council to manage, given the way in which responsibility is diffused through the membership?

(*Mr Cox*) The Jameson report, which the Copus council looked at, was quite clear on the balance of responsibilities. Copus council did have that report in front of it.

Dr Iddon

284. When I was questioning Dame Bridget last week, she gave us the clear impression that she did not know what the finances were, the budget of Copus. She said that the Royal Society handled all of that. Would that be a true interpretation of the relationship between Copus and the Royal Society, and, if so, what about the independence of Copus, on which great play has been made?

(*Mr Cox*) The position on finance is that in the business plan that was presented at the Copus council in May, very clear financial details were provided then. It certainly was there then. The Royal Society handles Copus's monies, in an accounting sense, because they are granted to the Royal Society from OST. We have a formal contract which does that. The book-keeping is done by us.

Mr Hoban

285. You have used some careful wording there perhaps, but did Dame Bridget have access to the numbers prior to the main meting? Has she always been aware of the budget of Copus and how the money is being spent?

(*Mr Cox*) I have certainly discussed it with her, yes.

286. What have you discussed?

(*Mr Cox*) It is not very difficult. Would it be helpful if I ran through the finances?

287. Yes, it would.

(*Mr Cox*) There are three sources of income: the Royal Society's parliamentary grant; a direct grant from OST for Copus grants; and private sector contributions for the book prize. Also, we get support in kind to Copus from the BA and RI. The direct OST grant to Copus is £272,960. This is for Copus grants, of which £42,000 is for administration. In addition, from the Royal Society, from its own parliamentary grant that it gets direct from OST, which is not hypothecated, we devote £105,000 additionally to Copus grants. So for Copus grants

[**Mr Hoban** *Cont*]

alone, there is £377,960 *per annum* approximately. In addition, there is an allocation from the Royal Society's grant in aid of approximately £62,000 for activities and £43,000 for staff, overheads and other things. Dame Bridget was aware in general terms of those figures because I had been through them with her.

288. Did it happen on a regular basis?

(*Mr Cox*) Yes, reasonably—certainly annually.

Dr Turner

289. Dame Bridget told us that the Royal Society runs Copus and does not respond to the invitation to apply to the OST for core funding for Copus's new form. Is this true, and, if so, why?

(*Professor Enderby*) If I could take you back to the September meeting that Mr Cox has referred to, the Council spent most of its time discussing governance rather than function. I think that was symptomatic actually of the difficulties that subsequently came about. We worked out what we thought were very good proposals that would be embedded in a business plan that would be submitted to OST. We do not want to get into the business of direct delivery, but there are generic issues of science communication, and we listed four problems. Dame Bridget was unable to accept our offer to define more closely the role of Copus as opposed to its governance, but in the event we submitted to the May council a business plan, and on the basis of that would be our application to the OST. I do not think that we could have done it any differently. We cannot go to the OST and ask for money unless we define the use to which the money would be put.

290. Is the business plan available publicly? Could we have a copy?

(*Mr Cox*) In very draft form. It was considered at the Copus council in May and this is why I was quite heartened because we began to get to the nitty-gritty and discuss what Copus could be about. It is in draft form which has not been approved; it was just something that the Society produced to try and help the process along.

Bob Spink

291. Could you nevertheless take us through some of the business plan?

(*Mr Cox*) I do not think I can at the moment. I did not bring it with me.

292. From memory.

(*Mr Cox*) Rather than do it from memory, I would much prefer to give you a note on that. I can remember some of the things but the discussion was so convoluted that I think I prefer to go back to the original document.

Dr Turner

293. The proposition was not for a separate core funding for Copus.

(*Mr Cox*) It was my responsibility to put into the Royal Society's bid for the spending review 2002—I wrote in my letter to John Taylor: "A separate bid will be submitted for Copus following the council meeting, to ensure it is resourced to carry out its newly defined role." I had flagged up, which was my responsibility, to OST, that there would be an additional bid coming in for Copus from us, as soon as the Copus Council had been able to agree on a programme that it wished to submit.

294. There was no question of you not being prepared to —

(*Mr Cox*) On the contrary; I certainly would not have written this because you never write anything to government that you are not prepared to go along with, because you get picked up on such things.

(*Professor Enderby*) Can I perhaps give a flavour of some of the projects that we were proposing and building in? What lessons can be learned from activities to date? Is redundancy in the form of different organisations, groups or individuals, pursuing broadly similar agendas, and in this case the strength of the grass-root nature of how we do things in the UK—is there significant redundancy and overlap; and, if so, may it not be a fruitful aspect of an evolutionary process? In this respect, how does the UK compare with other countries? Are there generic problems with delivery and, if so, what are they? Those issues go across all types of science communication, and that is what we felt that Copus should be doing. We wanted that embedded in the business plan that we could submit to OST.

295. Were you happy to discuss all financial details with Dame Bridget?

(*Mr Cox*) At all times, yes, certainly. There is no question of not being happy to discuss financial details at all. It is all published anyway, so it is not as though anyone would want to keep anything secret.

296. Did Dame Bridget not avail herself of those opportunities?

(*Mr Cox*) Not to my knowledge, no. She certainly did not ask me for any specific details at any time, although she was aware, because I had briefed her, as I have just done with you, along those lines.

297. You did not routinely share papers with her.

(*Mr Cox*) Routinely she was able to see anything she wished. She rarely asked, I have to say.

298. If she had to ask to get them, you would not have given them to her as a matter of course—"this is next year's budget, Dame Bridget—what do you think?"

(*Mr Cox*) We did precisely that at the May meeting. "Here is next year's budget. Dame Bridget, what do you think of it?" That is exactly what we did. The council had only been running for a year, so the budget for the previous year had already been decided before the new council was in place. It had to be; otherwise there would have been no money there.

Mr Heath

299. Lord Jenkin is a facilitator, so you have a committee now with no chairman. Is there any prospect of a chairman?

(*Mr Cox*) I do not see any difficulty in finding a chairman once we feel, as a result of Lord Jenkin's facilitation, confident that we have an organisation and a council that is able to take things forward. There will be no difficulty.

300. You are saying that a committee which has failed to identify its future form and function with a chairman will now do so when?

(*Mr Cox*) I cannot say whether Lord Jenkin will be successful. His role is to see whether he can bring together the different elements of the Copus council. The council was composed of a group from three organisations and now it comprises nine organisations. I am hopeful, but these things do take time to come together.

301. That is obvious from the history. Is the rudimentary business plan that you submitted to the May council extant as the way forward; is that the basis on which you think Copus will develop?

(*Mr Cox*) We have certainly suggested that to Lord Jenkin, yes.

302. Do you anticipate that there is a measure of agreement within the council for that?

(*Mr Cox*) There were very diverse views. That is one of the reasons why I was slightly hesitant in giving you a copy because there was not agreement around the council table about that business plan. That was not to say there was disagreement. I just think the process needed time for everybody to agree on a way forward.

303. It has taken quite a lot of time already, has it not, without much happening?

(*Mr Cox*) Absolutely.

(*Professor Enderby*) The council does have difficulty with words like "co-ordination", to take one example, because it can mean anything you want. It is only fair to point out, if I may, that during all this the Copus activity has continued. I slightly disagree with Dame Bridget on one point. I think she rather downplays the grants and the book prize and the open meetings, which I think are terribly important. If you look at the geographical distribution, I should think every one of you around this table in your own constituencies have benefited from the small grants. We get incredibly positive feedback from that. It is a way of democratising science. All that has carried on. The one thing we have not got totally to grips with is our vision. I have a vision, which I suspect coincides rather closely with Lord Jenkin's vision. We are out of the business of direct delivery and we are in the business of looking at generic issues. That has to be embedded in the business plan, and that is the point where we have not yet got the council fully on board.

304. I would be delighted if there was evidence in rural Somerset of the work, but it does worry me that given the intention of Copus over the last couple of years has been to create it into an umbrella body to co-ordinate public understanding and science work, the co-ordination approach seems rather negative to that role.

(*Professor Enderby*) I guess that is the price you have to pay for having a very broad-based committee. There will be a divergence of interpretation. To that extent, I think I underestimated the spread of opinion. I think those two go together.

305. Lord Sainsbury, the Science Minister, backed the new approach of Copus, since when very little, frankly, has happened to develop that approach. Has there been no either impatience or curiosity expressed by the Minister in the future of the body which funding is being provided for?

(*Professor Enderby*) I cannot obviously speak for Lord Sainsbury, but I think we are all slightly frustrated at the slow progress.

306. He has not made any approaches to the Royal Society or to Copus as a body.

(*Professor Enderby*) I think one of his colleagues attended the September meeting.

(*Mr Cox*) To pick that point up, Lord Sainsbury has taken a close personal interest in the development of Copus. He has attended at least two of the Copus meetings, one quite recently in September. Since then, I and several others have been in regular contact with his officials. I know that the President of the Royal Society has been in contact with the Minister about Copus. We are all very, very keen indeed to get Copus moving, but it has proved extremely difficult to do so and get agreement round the Copus council table about the way forward.

Bob Spink

307. Would it be fair to say that when the business plan emerges eventually, as a mature document about which there is general agreement within the council, at that point will you find a chairman so that Lord Jenkin's influence will be removed from the council?

(*Mr Cox*) We do not really have a position on that, until we know what Lord Jenkin is going to recommend. We have a completely open mind about what next. We certainly feel that we have a business plan which is the basis for taking things forward.

Dr Turner

308. Professor Enderby, you said that you had not got the council fully on board. It seems to suggest there is some tension there. Is "we" the Royal Society or is it all three parent institutions? Is there some conflict in terms of who calls the shots as far as Copus is concerned, between the Royal Society and Copus? That is the impression I have gained.

(*Professor Enderby*) It is a very fair question, if I may say so. There is an ambiguity in the relationship between the three founding partners and the council. That is absolutely clear just by looking at the constituency of the council. There are two from the founding members and one from each, so there is an ambiguity. My view—and I would be very interested to know whether Stephen agrees with this—is that the three founding members take overall responsibility for the Copus, with the very strong

[Dr Turner *Cont*]

advice of the council; but there is undoubtedly an ambiguity that was not resolved at the outset. In that context, we refer to the three founding organisations.

Bob Spink

309. David raised a point about co-ordination, which is a difficulty. It is a very general term, so can you say in what specific areas there was a difficulty in achieving co-ordination?

(*Professor Enderby*) Suppose, for example, PPARC and some other organisation wanted to run a week's work on the new possibility of an earth-like planet: there is redundancy there. In some sense, they are both using public money. Should Copus say "hang on a minute, you had better do it?" Some people interpret co-ordination in that sense—that we would try and stop someone doing something which somebody else was doing in the system. My view is that both organisations know that they are running parallel programmes. When you use the word "co-ordination" some people think the council is going to try and stop you doing what you think is appropriate for your area.

Dr Iddon

310. When I was questioning Dame Bridget last week, I asked her about the previous re-configuration of Copus in 2001. I assumed that it was herself who recommended the re-configuration and the re-housing of the Royal Society, but she replied: "We had an expert outside organisation who do this sort of thing as a matter of course. I cannot remember the name of it. I can let you know."

(*Mr Cox*) We think it was the Jameson report. We are happy to let you have a copy if you want it. September 2001 was the Jameson report.

311. That is fairly recent, is it not? There was a recommendation to re-configure Copus.

(*Mr Cox*) There was a paper, which was prepared under my name, and I am perfectly happy to let you have a copy. I cannot recall the date but that was the rationale for the re-configuration of the Copus council. It was the paper that was presented to the three councils.

312. The point I am really coming to is that that was fairly recent, in 2001, as far as I can see from the evidence in front of me. I would just like to refer to the press release you put out today. Today we have questioned you about the way forward and asked you whether you think that Copus has been doing a good job during this difficult period. You have given us a fairly good impression and mentioned the book prize and the grants *et cetera*; yet in your press release you are not very positive. There seems to be a conflict between the evidence we have taken today and what you have said in your own press release today. You have said this: "We share Dame Bridget's disappointment that more rapid progress was not made in mapping out a new role for Copus." You also say: "The Copus council continues to consider how it can best develop Copus to underpin science communication in the UK." It does not sound very positive, in the sense that you have found a way forward.

(*Mr Cox*) I think that is a fair comment. We are very disappointed that a way forward has not been found. We were very sorry—and that means all the Copus council but particularly the three bodies that feel personal responsibility, RI, BA and RS, for Copus. We are disappointed that there has not been progress and an agreed way forward. We are looking to Lord Jenkin to begin to see whether one can indeed come together with a way forward.

313. My personal view is that you seem to have set up a very complicated beast here. You have three major and very distinguished scientific bodies that are responsible for Copus; and you have enlarged the council to include so many people that it cannot apparently reach agreement, which is what you have said this afternoon. Perhaps you have such a complicated beast that it needs simplifying and releasing and giving independence. What would you say to that?

(*Mr Cox*) The key word "independence" was discussed and the Copus council wished to remain as an unincorporated body with the present arrangements for the next three to five years. That was in the report and that is what the Copus council bought into, or agreed to. It might be the case that the beast is too complicated. There might be a structural problem here. When it was set up at Dame Bridget's request, it may be that we were setting up something that was too complicated, in order to try and have everybody on board. That might be the crux of the problem.

Chairman: Thank you very much for coming here and helping us with our inquiry. You can go ahead now and produce a report. I am sorry the gestation period has been so bad but we hope the re-birth will be somewhat better.

APPENDICES TO THE MINUTES OF EVIDENCE

APPENDIX 1

Memorandum submitted by the Academy of Medical Sciences

The enclosed paper summarises the activities and achievements of the Academy of Medical Sciences in its first three years of operation. It owes its growing success and reputation to the expertise and energy of its Fellowship, the dedication of the Officers and Council Members, and the commitment and enthusiasm of the administrative team. Despite limited resources, financial and human, and a high degree of uncertainty about future funding, the Academy is making its mark. Increasingly sought for its views and comments on policy matters and on issues of medical science, the Academy is leading the way in tackling key issues relating to research infrastructure and careers, particularly the rejuvenation of clinical academic medicine throughout the UK. A pre-publication copy of the Academy's latest report, Clinical academic medicine in jeopardy is enclosed.

The Academy is independent and, unlike the other learned academies, as yet receives no contribution from the Science Vote. It covers its core costs from a start-up grant from the Wellcome Trust, which comes to an end in 2003; from the subscriptions of its Fellows; from generous donations; and from income earned from the provision of services to the medical science community. The Fellowship is the Academy's most powerful asset: the Fellows' enthusiasm and commitment to the work of the Academy (unpaid) underpins the success of current activities. The Fellowship also provides 25 per cent of current income. A fundraising campaign is under way to raise funds to assist the expansion of the Academy's programmes.

Looking to the future, the Academy is eager to extend its services to Parliament, to Government Departments, Industry and to other interested bodies; to undertake research and policy projects that will address the key medical and health issues of the day. Among our key objectives are (a) the implications and assessment of new techniques (genomics, proteomics, metabolomics) in both diagnosis of disease and selection of appropriate treatments, (b) bringing together a wide range of disciplines from medicinal chemistry to the law and social sciences to inform and address the medical and ethical aspects of scientific advances in an aging population, and (c) to enhance the collaboration between academics involved in biological and clinical disciplines with scientists in industry to promote the rapid translation of research into practice and expand the national industrial base. To achieve all of these objectives a grant of £1,000,000 per annum from government sources would be needed.

April 2002

Annex

The Academy welcomes this opportunity to respond to the Science and Technology Committee inquiry. This paper will describe the background that led to the formation of the Academy in 1998, detail the achievements of the first three years and provide information about current levels of funding and resources, and set out the Academy's programme for the immediate future.

INTRODUCTION

As this paper will demonstrate, the Academy has a commitment to knowledge and policies that will improve health for present and future generations. The remarkable progress being made in the life and medical sciences bring the prospect of great benefit to healthcare but they have also given rise to much public anxiety. The Academy has a key role to play in the independent assessment of new developments and in informing policy makers and the public about the likely implications and any possible hazards. In recent years much concern has resulted from the high level of public exposure given by the media to maverick science. AIDS, BSE, GM foods and the MMR vaccine are all important topics where this has taken place. It has proved very difficult to persuade the public to give due weight to the consensus of properly conducted, peer reviewed science in these areas. The Academy, as an independent expert body, has an important role to play in serious, informed scientific debate on such contentious issues.

Discoveries in basic medical sciences have not always been recognised promptly as having relevance to clinical practice and it can take considerable time, years and even decades, before some discoveries have been translated into benefits for patients. One of the major objectives of the Academy is to promote and facilitate the rapid application of research to the practice of medicine and to the advancement of health and welfare.

In order to achieve these goals, is it is important that institutional structures and organisational culture are reformed in such a way as to facilitate and encourage a move towards conducting research and teaching on an interdisciplinary basis. Success is likely if there is the right mix of skills addressing medical research.

BACKGROUND

Founded in 1998, the Academy of Medical Sciences is still relatively new but has already established a strong position within the UK's Academy group, alongside the Royal Society, Royal Academy of Engineering and the British Academy.

The Academy of Medical Sciences was established following the report of the Atiyah working party to the Medical Education and Research Coordinating Committee (MERCC). It was formally inaugurated in November 1998 as a charitable company limited by guarantee.

A founder fellowship of 351 fellows were nominated by the Royal Society (90); the Royal Society of Edinburgh (20); The Council of Heads of Medical Schools (90); the Academy of the Medical Royal Colleges (120); and MERCC (31). The current number of Fellows, following the elections of 9 April 2002, stands at 714.

REMIT

The Academy's prime purpose is to promote the translation of medical science into clinical practice for patient benefit. It is an independent, interdisciplinary body representing the medical science community and those involved in the delivery of health care: clinical academics, non-clinical scientists, veterinary scientists, dentists, nurses, and the professions allied to medicine.

With such broad representation, the Academy occupies a unique position within the research community, with the potential to play a key advisory role to both the Office of Science and Technology and the Department of Health. The Academy currently enjoys excellent working relations with the R&D Department of the DoH. It also maintains regular contact with officials at the OST and is hoping to involve Senior Officers more prominently in a new initiative to be launched later this year. [See Next Steps].

In bringing together these many disciplines, the Academy provides an intellectual focus for the medical sciences and seeks to influence national, fiscal and regulatory policy. Policy work is targeted at four key areas:

- research environment and infrastructure requirements;
- recruitment and training;
- research standards;
- research funding.

CURRENT PROGRAMMES AND ACTIVITIES

1. *Scientific advice*

A considerable amount of the Academy's effort and resources is devoted to providing expert advice to Government and policy makers. This takes many forms: printed reports, responses to consultations, representation on Government panels and committees, and evidence to parliamentary committees. The Academy has responded to the following:

- Regulation of Biotechnology;
- Code of Practice for Scientific Advisory Committees;
- R&D expenditure in Government departments;
- openness and animal procedures;
- Science and Society;
- Phillips report: Academy paper on issues of governance;
- livestock infections: written evidence to the Royal Society inquiry;
- use and disclosure of medical data;
- revalidation: a response to the GMC;
- modernising the SHO grade: a response to the Department of Health;
- Review of Appraisal, Disciplinary and Reporting Arrangements for Senior NHS and University Staff with clinical and academic duties: a response to the Follett report.

The Academy participated in the inquiries into Complementary and Alternative Medicine and Stem Cells, providing oral and written evidence.

In November 2001 the Academy was invited to provide a briefing on medical issues for the Science & Technology Committee of the House of Lords. Five key topics were chosen from over 90 suggestions submitted by the Fellowship:

- new, emerging and re-emerging infections;
- vaccination—benefits, risks and new potential;
- personal information, confidentiality and medical research;

— organ and tissue retention for research and teaching;

— stress—myths and realities.

As a result of this briefing, the Select Committee will, in 2002, conduct an inquiry entitled "Fighting infection".

2. *Working parties and reports*

Academy investigations are carried out through dedicated working groups. Topics for study are selected from suggestions submitted by the Council and the wider Fellowship, drawing upon their collective knowledge and experience. Examples are listed below. For a complete list of publications see Annex B.

Zinc Cadmium Sulphide dispersion trials: a report on these trials was prepared at the request of the Chief Scientific Advisor at the Ministry of Defence. The report has been published by the Ministry of Defence and a paper based on the findings has appeared in the Journal of Occupational Medicine.

Career Structure And Prospects For Clinical Scientists: a working party chaired by Professor John Savill. [See section on Research Support.]

Academic Medical Bacteriology: a working party chaired by Professor Brian Spratt. A group has been established under the chairmanship of Sir Richard Sykes to oversee and implement the report's recommendations and the Academy will be working closely with all the stakeholders, including the Department of Health.

Non-Clinical Scientists on Short Term Contracts in Medical Research: the report of a working group jointly chaired by Professor Pat Jacobs and Professor Jim Smith.

A detailed report was published in February 2002: it supports and extends the recommendations of the Concordat on Contract Research Staff Career Management, and offers some solutions.

The Academy of Medical Sciences has also collaborated with The Royal Society and others on areas of common concern.

The Medical Uses of Cannabis: a report produced by a joint working party with the Royal Society chaired by Peter Lachmann and published in 1999.

Scientific Fraud and Misconduct: a NAPAG (National Academies Policy Analysis Group) working party chaired by Peter Lachmann. A paper was presented to NAPAG in January 2002.

Transmissable spongiform encephalopathies: a statement by the Academy of Medical Sciences and the Royal Society. Published May 2001.

The Academy has also published discussion documents on Diet and Diseases: Facts and Fantasies; its response to the House of Lords select committee on Complementary and Alternative Medicine; and a position paper for the Chief Medical Officer on "Vaccines: current status and future needs".

3. *Research Support*

The Academy's influential Savill report (published April 2000) led directly to a Department of Health initiative to support mid-career clinical scientists. The DH scheme is offering eight awards a year for five years until a steady state of 40 fellowships has been reached. The Savill report estimated that, when fully established, some 300 clinician scientists should be supported in the UK. The importance of this initiative should also be seen in the context of the rising numbers that will require clinical training in the future to meet the anticipated need for doctors. The Academy has also set up its own Clinician Scientist programme and is currently seeking additional awards to expand its research portfolio. Current partners in the Academy scheme include the MRC, The PPP Foundation, Leukaemia Research Fund, Arthritis Research Campaign, and the Primary Immunodeficiency Association.

The Academy is a member of the National Clinician Scientist Monitoring Committee (chaired by Sir John Pattison, FMedSci) and provides a professional mentoring service to the UK's Clinician Scientist Programme for which it receives a support grant from the DoH.

4. *Meetings and lectures*

The Academy has developed a broad programme of meetings. It holds events associated with the major corporate events in the Academy's annual calendar (new Fellows' admission day, the Annual General Meeting), meetings around the UK for the Fellows and colleagues, and a programme of interdisciplinary single-topic meetings.

Regional meetings are designed to provide a forum in which local fellows can discuss the affairs of the Academy with the Officers. This business meeting is then followed by a programme of scientific talks and an open discussion on a controversial topic. Meetings have taken place in Edinburgh (1999), Cambridge (1999), Manchester (2000), London (2001), Newcastle (2001), and Cardiff (2001). Further meetings are planned in Leicester, Southampton and Birmingham.

There is an annual lecture in memory of Jean Shanks, supported by the Jean Shanks Foundation. A full list of meetings is attached at Annex A.

5. *External relations*

(a) *In the UK*

While the Academy of Medical Sciences is firmly rooted in its expert fellowship, it also has a role to play in the wider society in which it operates. For the Academy to achieve its objectives, interactions with external agencies and with the wider public are vitally important. At all times it seeks to complement (not duplicate) the activities of other institutions.

Working relationships and alliances have been established with the following organisations:

- Parliamentary Select Committees;
- Universities UK;
- Council of Heads of Medical Schools;
- Higher Education Funding Councils;
- Royal Colleges;
- Medical Research Council;
- Health Departments—and different divisions within those departments;
- governing bodies of the professions allied to medicine;
- British Medical Association and others;
- Private Sector: research charities and trusts.

The Academy collaborates regularly with its sister Academies, either through the National Academies Policy Analysis Group (NAPAG), or through specific activities. For example: the Academy is officially represented on the Royal Academy of Engineering's Biomedical Engineering Focus Group. Examples of collaboration with the Royal Society and The British Academy through meetings and reports are listed elsewhere in this paper.

The Academy believes that much needs to be done to improve the presentation of medical science, particularly in the press and media. The Academy's working group on media relations recommended that the Academy should develop a professional and comprehensive communications strategy in order that it can make its views available to the public. The Academy will be seeking funds to support this strategy.

(b) *Overseas*

The Academy was invited to the Inter-Academy Panel in Tokyo in May 2002 and was a co-host with the Institute of Medicine and the Japanese and Mexican Academies of Medicine of the first meeting of the world's Academies of Medicine and Medical Sciences that followed the IAP meeting. It has recently been involved with the first global meeting of the Inter-Academy Medical Panel in Paris 20–22 March 2002 which debated the topic Confronting infections and antibiotic resistance around the world.

The Academy has joined the European Federation of Academies of Medicine. Peter Lachmann was elected vice-president for 2001–03 and will automatically become president for 2003–05.

The Academy has close relations with the Académie des Sciences and the Académie de Medicine in Paris, co-operating in a number of issues affecting the EU such as grace periods for Patents, the Clinical Trials Directive, the Data Protection Directive, and the Copyright Directive. There have been three joint meetings: on TSEs, on Ageing and a meeting on stem cells.

NEXT STEPS

The Academy has an ambitious programme. Three key areas are currently under development.

The Academy of Medical Sciences Forum

The healthcare sector is highly complex with numerous interactions and partnerships, public and private. The Academy recognises the need to work with all players and is currently looking at mechanisms to increase the involvement of the industrial sector in the Academy's activities. Later this year, the Academy will launch the Forum. Its membership will be drawn from pharmaceutical, biotechnology, medical engineering and medical IT companies and will also embrace health products, the medico-legal and financial sectors. Government departments, Research Councils and other sponsors of research will be invited to join.

The key tasks of the Forum will be to deliver the benefits of medical research more rapidly to patient care, to foster the economic benefits of research, and to support the medical research profession. It will be a unique facility for:

- interaction;
- information exchange;
- collaboration;
- joint action.

In the long term the project will be self-sustaining, supported by the subscriptions of its members; in the short term, however, funds are urgently being sought to pump-prime the project.

The Research Integrity Initiative

There has been widespread discussion over the last few years on the problems of the management and treatment of fraud and misconduct in research. This has focused largely, but not exclusively, on scientific research and, within science, particularly on the medical sciences. The Academy's proposal for a Research Integrity Initiative has the support of the medical profession and the Department of Health. A small working group is currently being formed which will include representatives of the major stakeholders, including Universities UK, and there are early indications that the DoH will be willing to provide funds to support the initiative.

Academy inquiry into "Impediments to medical research"

Following the successful presentations to the House of Lords Select Committee on Science and Technology in November 2002, the Council of the Academy has decided to conduct its own inquiry into the impediments to medical research. The start-up costs of the project will be met from sponsorship and additional funding to cover the inquiry and publication costs is currently being sought.

Summary

These three new projects represent a significant step change in the Academy's developing programme and will go far to meeting the aspirations and expectations of the medical science community which provides such strong support for the organisation. However, additional funding is urgently required and the Academy will be looking to Government sources, amongst others, to support this work.

Governance

The Academy is a registered charity and a company limited by guarantee. The work of the Academy is overseen by a Council of 22 members elected from the Fellowship. This number includes the four Officers of the Academy:

President:	Professor Peter Lachmann
Vice president:	Lord Turnberg
Treasurer:	Sir Colin Dollery
Registrar:	Professor Mark Walport

The head of the Administration is the Executive Director, Mrs Mary Manning

Funding

The Academy's Fellows donate their time and expertise without compensation. Its fixed cost is largely that of the professional secretariat housed at 10 Carlton House Terrace (rent-free until 2003). The annual running costs of the Academy are currently around £400,000 but will increase significantly when the rent-free period expires next year.

A small team of five staff run the London office.

The Academy is supported by the subscriptions of its Fellows, generous grants from Trusts, particularly the Wellcome Trust, by income earned from services and by donations and sponsorship for specific activities. However, any further expansion in the scale and scope of the Academy's work (including the projects mentioned above) will require considerable additional resources.

Mary Manning

April 2002

APPENDIX 2

Memorandum submitted by the BA (British Association for the Advancement of Science)

INTRODUCTION

1. The BA (the British Association for the Advancement of Science) welcomes the opportunity to provide evidence to this inquiry, which is of especial importance to its role and activities. Although not formally a Learned Society, the BA is in receipt of Government funds and is particularly concerned with engagement and dialogue between science and the public. For these reasons, it is eager to supplement this submission with oral evidence to the committee.

THE BA'S HISTORY AND MISSION, AND THE SCOPE OF ITS ACTIVITIES

2. The BA was established in 1831 to advance science* both in the sense of furthering its development and promoting it to the public. In its early years, it did both with distinction. Over time, it has focused its role in response to changing circumstances so that today its purpose is to communicate with the public about science and to engage the public in discussion and debate about the future directions of science and its impact on society. It is the only organisation in the UK that is truly nation-wide, with a comprehensive multi-disciplinary base and with an open membership that is wholly dedicated to this end. The BA is incorporated by Royal Charter and is a registered charity.

3. The BA is recognised around the world for the quality of its programmes, its openness, inclusiveness and innovation. Through its wide range of activities, the BA brings science, and debate about science, to literally millions of people all over this country. Tens of thousands of school children, from five to 18 years of age, benefit from the BA's dynamic and popular programme of science-based activities for young people (paragraph 12). 10,000 people of all ages participate in the BA's annual festival, the extensive media coverage of which touches millions more (paragraph 11). The BA has a strong relationship with the scientific media, not least through its Media Fellowship programme (paragraph 14) and AlphaGalileo, its Internet-based press service, through which more than 2,700 science writers have access to information about current science from 1,350 researchers/organisations and to expert opinion from a database of over 3,600 active scientists (paragraph 13). Media coverage of its major events is outstanding (paragraphs 10,11). Through its publication, *Science & Public Affairs*, and the S&PA Forums, the BA contributes to serious discussion within the community of science communication, and between communicators, politicians, science funding agencies, etc. The BA coordinates National Science Week, in which some 1.4 million people participate (paragraph 10), and it is a partner in Science Year (paragraph 15). It is constantly seeking to invigorate the interaction of science and the general public, and to find new ways of stimulating dialogue and debate (paragraph 14). Its forthcoming move to the Wellcome Wolfson building at the Science Museum, and its close involvement in the Dana Centre (paragraph 20), will open up new opportunities for the BA to advance its mission.

4. The BA is a truly national organisation. There are currently 23 local BA Branches, with plans to increase this to 50 over the next few years. Branches run local programmes. The BA serves as a focus and a partner for a huge number of other organisations that have an interest in promotion of dialogue between science and the public: it has more than 120 Institutional Affiliates and 40 corporate member companies. The BA is an activity-led organisation: paragraphs 9-15 give an indication of the large numbers of people and organisations involved in its activities and media coverage. It also has approximately 3,200 individual members, including science journalists, active researchers, school-teachers and other members of the public who support the mission of the BA. Significantly the individual members of the BA are spread throughout the UK, as the analysis below demonstrates. This analysis also covers schools involved young people's schemes (paragraph 12).

REGIONAL DISTRIBUTION OF BA MEMBERS AND SCHOOLS

Region	*Members %*	*Schools %*
Eastern	13	16
East Midlands	4	3
London	20	8
Merseyside/N Wales	3	4
North East	4	1
Northern Ireland	1	3
North West	5	11
Scotland	10	8
South East	18	18
South West	7	7
Wales	3	9

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* The BA embraces the natural and social sciences, engineering, mathematics and medicine.

Region	*Members %*	*Schools %*
West Midlands	5	7
Yorks and Humber	5	5
Overseas	2	1
Total	100	100

5. In 2001, the BA's expenditure was £2.77 million and its income was £2.88 million. Extracts from the audited financial statements for the year 1 January—31 December 2001 are appended. In that year, the BA had an average of 54 staff, 43 of whom were employed directly by the BA, and 11 contracted. 15 staff were part time. The total reserves of the BA amount to only £700k, the equivalent of three months' expenditure and a low fraction of annual turnover compared with many not-for-profit organisations.

Government Support

6. The BA receives government funds both directly and indirectly. Direct grants from government in 2001 comprised:

- £634k from OST project funds to provide core support and support for National Science Week;
- £41k from OST for ECSITE-UK, for which the BA acts as fund-holder (paragraph 19).

Indirect grants included:

- £254k from the Royal Society including an annual grant of £185k to support the BA festival, activities for young people and core support; £18.5k towards the costs of publishing Science & Public Affairs; and £50.5k towards the costs of BA-organised COPUS activities (paragraph 22). These funds came from the Royal Society's Parliamentary Grant-in-Aid;
- £176k from NESTA towards Science Year (out of an agreed total grant to the BA of £500k). This grant came from funding provided to NESTA by DfES;
- the BA also received a number of small grants from Research Councils to support specific events and activities.

7. The value of the OST and RS support to the BA cannot be overestimated in terms of its financial importance, its implicit recognition of the value of what the BA does, and because much of it is given effectively as core support. While an RS grant has been made available for many years, OST support for specific initiatives dates from 1993 and for core purposes from some years later. This support, together with the fact that it is now given over a three-year period, has made it possible for the BA to plan ahead with much greater confidence and to develop new initiatives and grasp opportunities. It has also enabled the BA to cope with the inevitable fluctuations in income that face an organisation heavily dependent on grants. As a result the BA has expanded in terms of activities and staff and been able to play, once again, a central role in science communication in the UK. In addition, because of this revitalisation, the Wellcome Trust is providing the BA with a five-year development grant and supporting a new building on the Science Museum site in South Kensington, in part as a future headquarters for the BA.

8. The BA has occupied rent-free accommodation since 1972 at 23 Savile Row, London W1 on the basis of a memorandum of terms with the then Department of the Environment. In respect of all the services it receives, the BA pays a service charge to English Heritage, the main occupant of the building. The arrangement dates back to the agreements made with scientific societies for the occupation of Burlington House, where the BA was based from 1891 to 1958.

Communicating with the Public about Science

9. The BA is an activity-led organisation, which engages with the public about science and science-based issues. Its activities fall into five groups:

- National Science Week;
- The annual BA Festival of Science;
- Activities for Young People;
- AlphaGalileo; and
- Science communication initiatives.

10. National Science Week: With support from the OST, the BA initiated the first National Science Week in 1994 and has continued to coordinate it since then. In 2001—the last year for which detailed records are available—some 1,475 organisations and institutions arranged 6,200 opportunities for the public to take part in activities right across the UK. It is estimated that 1.4 million did so. In addition, extensive media coverage, particularly at local level, meant that the week impinged upon many millions more. Many countries organise science weeks but the UK week is the envy of many. We believe that it works well because of:

— the large number of bodies—educational institutions at all levels, museums, science centres, libraries, local groups, Research Councils, Scientific Societies—that are involved in science communication and which are eager to participate;

— the nature of the co-ordination provide by the BA, which encourages organisations to get involved by supporting organisers with materials, ideas, examples of best practice and PR guidelines; produces printed and online versions of the national programme; promotes the week; and exercises central control with a light touch;

— extensive media interest and involvement;

— enthusiastic support from government including the provision, through Copus, of small grants to support events and activities.

National Science Week is a good example of a win-win situation. The whole is greater than the sum of the parts and everyone involved benefits. It is also an excellent example of an activity-led way of getting the UK's large and diverse science communication community working together, and an indicator of the important role that the BA can play in this process.

11. The BA Festival of Science: The BA's Festival of Science—originally its Annual Meeting—has been held, with the exception of breaks in the two world wars, every year since the BA was founded in 1831. The most distinctive feature of the event, held in September, is its exceptionally high level of media coverage. Some 200 journalists register in the press centre and reports from the event can be found on radio and television, in newspapers and magazines both locally and nationally in the UK, and also overseas. This promotes and raises the profile of science and increases the status of scientists.

The festival demonstrates the BA's commitment to be a nationwide organisation. In its 170-year history, the event has been held in London only twice, in 1931 and 2000. Otherwise it has been held throughout the length and breadth of the UK—and on a few occasions in former years in Canada, Australia and South Africa. Today it is usually today held in conjunction with a local university.

The festival's core programme consists of some 300–400 presentations on recent scientific advances and their implications by scientists from a wide range of disciplines, including mathematical, medical and social sciences and engineering. Increasingly we try to ensure that these presentations form a basis for discussion and dialogue rather than being an end in themselves. The BA centrally arranges additional dialogue-focused events as part of the core programme. A programme committee is responsible for the overall shape of the programme, which consists of contributions from the BA's own scientific sections and from others who submit proposals, including the host university, Research Councils, companies and scientific and engineering societies and institutions.

The festival's core audience is scientifically "attentive" but largely non-specialist and comes from a wide variety of backgrounds and age groups. It includes a significant number of young people aged 16-18. In addition to the core programme, there are hands-on, workshop-based activities for five- to 13-year-olds and events for the more general public in the locality of the festival. Altogether some 10,000 people typically attend the festival but it impacts upon millions when the media coverage is taken into account.

12. Young People's activities: The BA arranges a variety of events and activities for young people, designed to fulfil a number of purposes. Science and technology-based activity days are run in different parts of the country to excite young people about science. They regularly attract thousands of youngsters, with teachers and/or parents for science-based workshops, demonstrations, drama and other activities.

To give recognition to investigations and project work and in order to give young people some real experience of science, the BA runs three award schemes. First Investigators, Young Investigators and CREST cater for 5s-7s, 8s-13s and 12s-18s respectively. Each offers graded awards (eg bronze, silver gold) depending on the complexity of the work undertaken and the length of time involved. Currently nearly 3,000 groups, mainly based in schools, work towards the First and Young Investigator Awards and, in 2001, 26,000 young people from nearly 900 schools gained CREST Awards. SETPOINTS, with which the BA works closely in the delivery of these schemes, report that Young Investigators and CREST are the most widely used of their type in the country. The BA is committed to work towards rationalisation of such schemes.

At the annual BA Science Fair young people with outstanding projects are selected to represent the UK at international science events and competitions, including an opportunity for one young person to attend the Nobel Prize presentations during the Stockholm International Youth Science Seminar.

We are also committed to encourage the development of communication and critical thinking skills in young people. Visions for the Future gives 16s-18s the chance through online debates and live events to have informed discussions of critical issues such as global warming, future energy supplies, transport, food supply and cloning. Science Communicators encourages achievements in communication in much the same way as the project award schemes do.

13. AlphaGalileo: AlphaGalileo is an internet-based press service for European science, engineering and technology—to which arts and humanities are shortly to be added. AlphaGalileo essentially provides a single site through which European research and other scientific news from universities, research institutions, journals etc can be made available to journalists worldwide on their desktops. The site also incorporates the former Novartis Media Resource Service in the form of a database of experts prepared to provide background and comment on scientific developments and issues. AlphaGalileo is currently funded by an EC grant, which runs until the end of March 2003. Partner organisations provide national offices in five other European countries—France, Greece, Germany, Portugal and Sweden—and other partners are being sought. Currently some 1,350 individuals are registered to provide information; there are over 2,700 registered users (journalists); and more than 3,600 on the experts' database. AlphaGalileo originated in PPARC, which passed its management to the BA in 1987 when it was felt that a more broadly based and communication-focused body would be more appropriate. The BA is actively addressing the challenge of how to sustain AlpahGalileo when the current EC grant comes to an end in 2003.

14. Science Communication initiatives: The BA is responsible for a number of other science communication initiatives. Science & Public Affairs is a bi-monthly magazine that focuses on science-related public issues. It started life as a Royal Society journal, became a joint RS/BA magazine in 1991 and a BA publication produced with tapering RS support in 1999. It is currently sent to BA members and circulated, gratis, to a number of key people in government, parliament, the civil service and industry.

S&PA Forums were started in 1999 to provide opportunities for more extended discussion of some of the issues covered in the magazine. Since their inception, the major part of the time at each forum has been dedicated to discussion of varying points of view presented briefly by a panel of experts and interested parties. Forums have been held at a variety of venues in London, including bookshops as well as more traditional venues, and are increasingly being held in other parts of the country.

SciBArs, which also take place in different parts of the country, are discussions based in wine bars or pubs, initiated by one or two brief contributions from experts. They noticeable attract a much younger audience than S&PA Forums and are in line with the BA's efforts to reach new audiences, use public-friendly venues and explore new forms of engagement with the public.

A series of lunchtime conversations between scientists ad the minister of Wesley's Chapel in central London also contributed to this exploration.

Media Fellowships were first established by the BA, as part of its contribution to Copus, in 1987 and have continued since then, now as a BA activity. Each year they provide up to ten, younger working scientists with an opportunity to spend six to eight weeks working in TV, radio, newspaper or magazine, under the guidance of a science journalist mentor. Their aim is to improve scientists' appreciation of the media and improve their communication skills—not to encourage them to become journalists, although some have done so. We have received consistently enthusiastic and positive feedback from fellows and media hosts alike every year.

15. The BA's key role in science communication led to it being chosen by the DfES, together with the ASE, to be a strategic partner of NESTA for Science Year. This has provided us with the opportunity to undertake a number of Science Year activities. We have divided these between the development of new and one-off initiatives on the one hand and the development and extension of existing activities to ensure their continuation beyond Science Year on the other. Among our one-off activities has been LaughLab, a web-based experiment run in conjunction with the University of Hertfordshire, to find the world's funniest joke and to try to reach a better understanding of why people of different backgrounds, eg gender or nationality, respond to jokes differently. LaughLab was launched at the BA festival last September and interim results were announced just before Christmas. Both occasions led to huge media exposure and to massive use of the website. To date 27,000 jokes have been submitted and 300,000 people have rated jokes. Other one-off activities have included the development of Footprints, a play for key stage 3 about genetics, and Discovery Day when over 3,000 10-14 year olds enjoyed a day of hands-on activities and workshops at the Royal Albert Hall in London.

The Role of the Royal Society and the Royal Academy of Engineering

16. The BA believes that both Academies play an important role in the life of British science and engineering. The BA has enjoyed long-standing support from the Royal Society and a constructive working relationship (paragraph 20) from which it believes both organisations have benefited. The BA also enjoys positive links with the Royal Academy of Engineering through its support for the BA's Engineering Section and through links between the Engineering Education Scheme and CREST Awards.

17. As the Academy of Science the RS has direct access to the sources of the UK's scientific excellence and is, in consequence, well placed to represent the views of the UK scientific community to the government and others and to provide to them the best scientific advice that is available. The Society also mounts an excellent programme of public events tailored to its situation, role and location. In addition to its public lectures,

summer exhibition and support for research in schools, we believe that recent developments such as that to link its University Research Fellows with Members of Parliament are excellent and exactly the sort of initiative that the Society's position makes it best suited to play.

18. With different purposes, different memberships, different audiences and different geographical bases, the BA and the RS complement each other in terms of science communication. It is important for UK science and for the UK as a whole that the Royal Society should focus on and utilise its pre-eminent strengths in promoting scientific excellence and providing advice of the highest quality. We believe that it should see its "public audiences" predominantly as those groups to which it has unrivalled access—the upper echelons of government, Parliament, the Civil Service and industry, who constitute the key decision makers and opinion formers in our society. The Royal Society's summer exhibitions and its public programme of events, usually jointly with other academies and societies, are making an important contribution to the intellectual life of the capital. But we think that it would be inappropriate to expect the Royal Society to change its role from one of leadership within the scientific community to one of public engagement of the type that is already being done so well by the BA. Consequently, we believe that it is crucial for the Royal Society to be able to continue to support bodies, such as the BA, that can more readily access other "publics" across the UK.

Co-operation and Co-ordination in Science Communication

19. In addition to its own initiatives, the BA works closely with other bodies in a variety of ways. Significantly, it provides an office base for the Association of British Science Writers (ABSW), with which it has a long-standing relationship, and for the recently established network of Science and Discovery Centres, ECSITE-UK. The BA believes that the co-location of such bodies is an excellent way to stimulate cooperation and coordination, and avoid duplication of effort.

20. Over the years the BA has enjoyed and benefited from excellent working relationships with other bodies. These include the Royal Society, with which we have worked together in Copus (paragraph 22), on Science & Public Affairs and in the Royal Society/British Association Millennium Award Scheme, which attracted a grant of £1.5 million from the Millennium Commission. We also work with the ASE, SETNET and SETPOINTS. In preparation for the opening of the new Wellcome Wolfson Building in South Kensington next year, we are working closely with the Science Museum, particularly on the development of activities for the Dana Centre within the building, which will be focused on developing new forms of activity to promote dialogue between scientists and the public, and promulgating them nationally.

21. The BA believes that new opportunities are emerging for increased cooperation across science and engineering. In particular, the development of the Engineering and Technology Board (ETB), with a commitment to public communication, suggests that a synergy could be developed between the Royal Academy of Engineering, the ETB, the Royal Society and the BA. The forthcoming BA Presidency of Sir Peter Williams, the founding Chairman of the ETB, in 2002–03 could be an ideal opportunity to explore this.

22. The BA has been an active partner in, and supporter of, Copus since it was set up in 1986 as a joint committee of the Royal Society, the Royal Institution and the BA. The BA has generally taken the lead in delivering those parts of any proposed Copus programme that were akin to or overlapped significantly with the BA's existing role. In that spirit the BA has supported the vision for the new Copus which sees it not as an activity-led grouping but one undertaking tasks, for example research and the development and dissemination of best practice, that support the science communication community overall. In line with previous comments on the value of co-location (paragraph 19), the BA believes that the co-location of Copus with the BA in the Wellcome Wolfson Building would be a creative and positive step in the right direction.

23. The UK's science communication community has expanded explosively since the mid-1980s and continues to do so. The BA has been a significant part of that expansion and is continuing to grow and to develop the essential two-way dialogue and informed debate that 21st Century science communication should be all about. In all this, some greater cohesion and co-operation would be desirable. The BA's track record in that respect is well evidenced by its co-ordination of National Science Week; by the role of our Festival in creating the largest annual gathering of science journalists and of science communicators, and in the 120 affiliated institutions in membership of the BA.

April 2002

Annex

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
STATEMENT OF FINANCIAL ACTIVITIES
FOR THE YEAR ENDED 31 DECEMBER 2001

	Notes	*Unrestricted funds*	*Restricted funds*	*Total 2001*	*2000*
		£	£	£	£
INCOMING RESOURCES	1				
Grants		801,750	1,300,193	2,101,943	1,850,133
Sponsorship		—	277,332	277,332	376,809
Subscriptions		264,432	—	264,432	195,521
Events income		163,863	2,710	166,573	142,063
Donations		717	50	767	25,073
Investment income		23,066	—	23,066	20,494
Bank interest		8,587	—	8,587	10,178
Other income		37,053	—	37,053	23,770
creating SPARKS (recovery of BA overheads)		—	—	—	25,000
Total Incoming Resources		1,299,468	1,580,285	2,879,753	2,669,041
RESOURCES EXPENDED					
Direct Charitable Expenditure					
Festival of Science		—	318,439	318,439	357,771[1]
National Science Week		—	184,791	184,791	173,362
CREST		—	337,918	337,918	225,049
Young people's programme		—	333,963	333,963	294,457
Science Communication Initiatives		—	119,116	119,116	86,400
Branches, Membership and Regional Support		481,874	—	481,874	489,701
AlphaGalileo		—	174,559	174,559	362,935
Science Year		—	186,103	186,103	–
creating SPARKS		–	(4,100)	(4,100)	114,000
ECSITE—UK		–	22,728	22,728	–
Activity support costs		–	295,115	295,115	327,309
Total Direct Charitable Expenditure		481,874	1,968,632	2,450,506	2,430,984
Other expenditure:					
Fundraising, marketing and public relations		121,920	—	121,920	120,553
Planning and control		201,553	—	201,553	199,302
Restructuring		—	—	—	36,881
Total resources expended	2	805,347	1,968,632	2,773,979	2,787,720
Net incoming/(outgoing) resources before transfers		494,121	(388,347)	105,774	(118,679)
Transfer between funds	3	(388,349)	388,349	—	—
Net incoming/(outgoing) resources		105,772	2	105,774	(118,679)
(Losses)/Gains on investment assets	5	(55,045)	—	(55,045)	(39,727)
Net movement in funds		50,727	2	50,729	(158,406)
Balances brought forward at 1.1.01		646,582	17,605	664,187	822,593
Balances carried forward at 31.12.01		697,309	17,607	714,916	664,187

APPENDIX 3

Memorandum submitted by the British Academy

1.1 The British Academy, established in 1902 by Royal Charter, is the national, UK-wide, academy for the promotion of the humanities and social sciences. Composed of c. 750 Fellows, it is a working Academy: it both recognises and represents the best of British research in the humanities and social sciences; it organises wide-ranging programmes of activities and events at a variety of levels as a learned society; and it also acts as a grant-giving agency.

1.2 In Britain, unlike many other countries, there is no single national Academy of Sciences. Broadly speaking, the British Academy acts in regard to the humanities and social sciences in the same way that the Royal Society acts in regard to the physical and biological sciences. In its grant-giving, moreover, the Academy offers distinctive forms of funding which do not duplicate but complement those provided by the Economic and Social Research Council and the Arts and Humanities Research Board.

1.3 Stated more formally, the aims and objectives of the British Academy, which are reviewed each year by its Council, are:

- to represent the interests of the humanities and social sciences nationally and internationally;
- to give recognition to excellence;
- to promote and support advanced research;
- to further international collaboration and exchanges;
- to promote public understanding and appreciation of the humanities and social sciences;
- to publish the results of research.

FINANCE

2.1 The British Academy receives a Government grant-in-aid through the Department for Education and Skills which in 2002–03 totals £13 million, of which £1.7 million is for administration. The allocations for the various programmes of activities are as follows:

	£
Research programmes	
Grants	2,695,665
Projects	850,000
Posts	3,300,000
Policy	35,000
International programmes	
Exchanges and joint activities	725,000
Overseas Institutes etc	3,300,000
Publication and activities programmes	
Publications	—
Meetings and conferences	187,000
Public Understanding	195,000
	£11,283,665

2.2 In addition the Academy has a small private endowment, mainly for restricted purposes as laid down by the original donor or benefactor; it levies an annual subscription from the Fellows; and it receives grants from a variety of private research foundations. The sums raised are of the order of £750,000 to £1 million annually.

2.3 Of the £1.7 million available from the grant-in-aid for administrative expenses, £265,000 is paid to the Crown Estate in rent for the Academy's premises in 10 Carlton House Terrace. Other occupants of the building, who include the Foundation for Science and Technology and the London offices of the Arts and Humanities Research Board and six overseas British research institutes, contribute c £90,000 towards the rent, and an additional sum of c £100,000 is raised from charges to external bodies which hire rooms for meetings and conferences. The Academy of Medical Sciences occupies three rooms in the building rent-free (on which see further below, para 5.2).

ACTIVITIES

3.1 The Academy's principal activities take three main forms (a) research programmes; (b) international programmes; (c) publications, meetings and other events.

(a) *Research Programmes*

3.2 *Grants* During the past year the Academy has made over 1100 awards under its various grant schemes (more than twice the number made by the ESRC and AHRB combined). The awards mostly consist of small grants (up to £5,000) to individuals in support of their personal research (as opposed to the grants for institutionally-based research projects which are provided by the research councils); and conference grants, to ensure that leading British research is adequately represented at conferences abroad and that key speakers from overseas can take part in similar meetings in this country. There is within these schemes an emphasis on the work of younger scholars. About one-third of the grants go to social scientists and two-thirds to researchers in the humanities. The Academy operates in wholly responsive mode.

3.3 *Projects* Project support goes notably (£330,000) to the New Dictionary of National Biography, due to be published in 2004, c. 15 per cent of whose research costs have been contributed by the Academy, the remaining 85 per cent being found by the Oxford University Press*. The remainder (£520,000) goes to some forty long-term collective research undertakings, many of them the British contribution to international projects. (As a result of the creation of the AHRB, and after a transitional period, the Academy is bringing to a close its support for the present portfolio of projects from the end of March 2003.)

3.4 *Posts* In all there are some 125 individuals in universities who are currently holders of research posts supported by the Academy:

- each year 30 appointments are made to three-year postdoctoral fellowships. The holders will have recently completed a PhD, and will be enabled to obtain experience of independent research and teaching in a suitable university environment and helped to improve their prospects of obtaining permanent academic posts by the end of their fellowship;
- thirteen two-year research readerships are awarded each year. They are intended to relieve established mid-career researchers of their normal teaching and administrative commitments, so that they may undertake or complete an approved programme of sustained research which will not only be an important contribution to knowledge but also help to enhance their future careers;
- there are three holders of British Academy research professorships, tenable for three years and designed for established senior researchers who have already published works of distinction in their field.

In these last two schemes the Academy meets the cost of a substitute post, rather than the stipend of the award-holder, so that, in addition to providing an opportunity for advanced research, there is an opening for a younger researcher to gain experience and become established in the academic profession.

3.5 *Policy* Research sponsored by the Academy may well turn out to have implications for public policy or provide understanding of the context and constraints within which policy decisions will be made. But the Academy has in addition developed mechanisms to mount independent, research policy related studies and to provide advice to the Government and other public bodies on issues relating to the humanities and social sciences. Examples include *The inclusion of the humanities and social sciences in the EU's 6th Framework Programme; Devolution and the arts, the humanities and the social sciences* (jointly with the Royal Society of Edinburgh); and *A Review of graduate studies in the humanities and social sciences* (all 2001). The major study currently under way is concerned with *The contribution of the humanities and social sciences to the knowledge-driven economy*. The Academy also responds to consultation documents issued by a wide variety of bodies, concerning such topics as the British Library's acquisitions policy, the Government's Green Paper on the reform of the school curriculum: 14—19, and the AHRB's review of its postgraduate support arrangements.

(b) *International Programmes*

3.6 The Academy's own international activities include:

- maintaining relations with overseas academies and research organisations with a view to promoting academic visits and exchanges and such other forms of international collaboration as may advance the interests of the humanities and social sciences in general and of researchers from the UK in particular;
- administering a series of grant schemes for British researchers, concentrating on the support of collaborative work—projects and networks; and

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* A special grant for this purpose was provided by the then Department for Education and Employment in 1992, which has since been consolidated within the overall grant-in-aid.

— overseeing the Academy's membership of appropriate international organisations such as the Union Académique Internationale, ALLEA (All European Academies) and the European Science Foundation.

3.7 In addition the Academy provides core funding for twelve UK-based organisations, seven which maintain research institutes overseas*, four which sponsor research abroad**, and the Council for British Archaeology. The underlying objective in providing core funding is to maintain, and where possible extend, the traditional strengths and standing of British research, by providing (a) the means to enable British researchers across a wide range of disciplines in the humanities and social sciences to undertake original work, including fieldwork in areas of major interest overseas; and (b) a base, where appropriate and/or necessary, which provides a range of academic and logistical support services in those areas, including buildings and residential accommodation, computing services, and library, or archival facilities. In relation to the Council for British Archaeology, the Academy seeks to enable the CBA to promote the study and protection of Britain's historic environment; to provide a forum for archaeological opinion; and to inspire public interest in, and knowledge of, Britain's past.

(c) *Publication and activities programmes*

3.8 *Publications* The publications programme forms a significant and expanding part of the Academy's activities. During the course of the present year the Academy expects to publish 25 to 30 new volumes: the texts of the Academy lectures and conference papers; Centenary Monographs, celebrating the best of British research in the humanities and social sciences in the past 100 years and looking forward to the challenges of the next; monographs by postdoctoral fellows; and volumes arising from research projects—in particular, editions of historical documents and illustrated catalogues of artefacts. Although the publishing programme is financed from the Academy's Public Account, in recent years the Publications Fund has recouped its expenditure from income and has therefore made no call on the grant-in-aid.

3.9 *Meetings* The Academy organises some six to eight conferences each year under its own auspices, and others in collaboration with other bodies, the Royal Society and the Academy of Medical Sciences among them. These meetings are in addition to lectures, some in privately endowed series, held in London and in universities around the country. Attendance at all the events in London has increased significantly since the Academy moved into its present premises.

3.10 *Public Understanding* Different kinds of meetings are also organised, for less specialised audiences, intended to increase public appreciation of research in the humanities and social sciences. Some take place in London, others elsewhere. Examples include: a session at the British Association for the Advancement of Science in 2001 on *From Scribe to Scanner: Computers, Images and Ancient Documents*; lectures for sixth-form pupils given by leading economists; and a discussion meeting in collaboration with the Institute of Contemporary Arts on *Do we need to reclaim literature from the academic critics?* A book prize was initiated in 2001 and is being organised again this year, to celebrate works that are not only of the highest academic standard but also accessible to non-specialist readers. And an internet-based media service, an extension to the AlphaGalileo service covering science, has been launched to increase press coverage of research stories in the humanities.

3.11 As part of its strategy for increasing public understanding and appreciation of the humanities and social sciences, the Academy is actively developing its website with the aim that it becomes a "first port of call" for researchers, academics, and interested members of the general public. In particular the objective is to promote the Academy's public understanding activities, and to provide more information both about the research which the Academy has funded and about the Academy itself. In July 2002 the Academy is launching PORTAL, its directory of electronic resources for researchers in the humanities and social sciences. The site has been developed with the assistance of Fellows of the Academy, its postdoctoral fellows, and graduate students, and offers easy access to online information about research resources. PORTAL covers the whole range of subjects which fall within the Academy's remit. Links to numerous types of resource are included such as texts of major works, images of artworks and artefacts, datasets, maps, and dictionaries and encyclopaedias. The various sites to be found via PORTAL have been selected because they have high quality, substantial content and potential utility, because their ownership is responsible, and because the material is accessible without subscription and kept up to date.

THE FELLOWSHIP OF THE ACADEMY

4.1 The Academy is composed of approximately 750 Fellows, elected for their distinction in their various subjects. Each year, under the Academy's statutes, a maximum of 35 elections can be made, and customarily half the Fellows elected come from humanities and half from social science disciplines.

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* The British School at Rome; the British School at Athens; the British School of Archaeology at Ankara; The British Institute in Eastern Africa; the British School of Archaeology in Iraq [in abeyance]; the British Institute of Persian Studies; The Council for British Research in the Levant.

** The Egypt Exploration Society; the Society for Libyan Studies; the Society for South Asian Studies; The Committee for South-East Asian Studies.

4.2 Election to the Academy is for life (the average age at election is 54). The running of the Academy is restricted to Fellows under the age of 70, and most of the work falls on those still in academic posts.

4.3 The electoral process is rigorous and careful. It combines the preparation of written citations, thorough discussion, a secret ballot, consolidation and discussion of lists in the humanities and social sciences respectively, a recommendation by the Council of the Academy, and the formal approval of the Annual General Meeting. Recently, in a wide-ranging consultation, all university Vice-Chancellors and heads of related research institutions such as national libraries, museums and galleries were invited to suggest possible names from within their institutions of researchers suitable for election to the Fellowship. These are now under consideration by committees of the appropriate disciplinary Sections.

4.4 The Academy is careful to monitor the distribution and representation of academic subjects in elections, the spread of institutions, and the gender of candidates. The Council sets out "guideline" figures for each subject, based on an agreed benchmark. Selection panels are enjoined to scrutinise the claims of all eligible candidates across the university spectrum, concentrating especially on those institutions and departments highly rated in the Research Assessment Exercise. As regards gender, 21 per cent of those elected to the Fellowship over the last three years have been women (a rising trend over the past 15 years)—the percentage of women university professors in the humanities and social sciences is 14 per cent.

4.5 Among the duties of Fellows, which they perform without remuneration, is the assessment of all applications made to the Academy for research support. This constitutes a resource of substantial value to the research community in the humanities and social sciences which makes no call on the grant-in-aid.

Administration and Premises

5.1 The Academy employs a staff of 30. Since 1998 it has occupied 10 Carlton House Terrace on the Crown Estate, a move which thus brings the Academy into close and useful physical proximity to the Royal Society. The premises give the Academy for the first time in its history,* a suitable number of public rooms, which have enabled it to organise properly its own academic meetings, workshops, lectures and symposia, and to offer its facilities as a service to the research community and the public at large.

5.2 When the Academy was first offered the lease of 10 Carlton House Terrace, the building was in poor condition internally, and an expensive refurbishment programme had to be mounted. The necessary money was raised by the Academy privately (including contributions from the Fellows themselves), and from charitable and research Foundations. The largest single contributor was the Wellcome Trust, to which the Academy and the Royal Society submitted a joint application for assistance with the development of facilities in the two adjoining buildings (No 6 and No 10), in order to promote all aspects of the natural and the social sciences and the humanities. Both bodies were keen to build on their existing collaboration, and since they have a joint concern in representing the interests of learned societies in their respective fields they wished to be able to provide services and facilities to both their respective communities. The Wellcome Trust made a generous grant of £1.8 million in response, of which £1 million went to the Academy for the refurbishment of its building. The one condition attached was that the fledgling Academy of Medical Sciences (AMS) be granted rent-free accommodation for a period five years in order to help it to become established. The AMS occupies three rooms in 10 Carlton House Terrace, and although it pays no rent at present it does pay for the services provided to it. The rent-free period comes to an end in early 2003 and negotiations are in progress between the two Academies to agree the precise basis for payment of an equitable share of the rent thereafter.

June 2002

APPENDIX 4

Memorandum submitted by the Biotechnology and Biological Sciences Research Council (BBSRC)

1. Introduction

BBSRC currently offers three Fellowship Schemes to enable scientists to devote their time to independent research and scholarship:

- BBSRC David Phillips Fellowships: for scientists who have demonstrated high potential during their research training and initial years of postdoctoral research;
- BBSRC Research Development Fellowships: for younger members of university teaching staff who wish to devote themselves to full-time research;
- BBSRC Professorial Fellowships: a small number of prestigious fellowships for outstanding scientists at the height of their research career.

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* From 1928 to 1982 the Academy occupied accommodation assigned to it rent-free by the Government, in 6 Burlington Gardens and later in Burlington House. Thereafter the Academy, having outgrown the space assigned, moved to 20–21 Cornwall Terrace in Regent's Park on the Crown Estate.

2. Issues Raised by the Committee

(a) an analysis of the cost efficiency of the programmes, indicating whether your accounts isolate administrative costs associated with these schemes

Current position on Fellowship awards is set out below:

Scheme	*No of Current Awards*	*Value (£K)*	*Annual Expenditure (£K pa)*
David Phillips	32	9,101	1,796
Research Development	8	747	248
*Advanced	10	3,371	724
Professorial	6	2,791	516
TOTAL	56	16,010	3,284

*Following a Council review in 1999 of BBSRC's Fellowship schemes the Advanced Fellowship Scheme was discontinued. Existing awards will run to completion with the last Advanced Fellowship ending in January 2005.

Administrative costs are not easily obtained. They are not isolated within the accounts system and the administration of the schemes are split between two sections of the BBSRC Office with input from other sections at various levels. These figures could only be established at disproportionate cost.

It is worth noting, however, that BBSRC's administration costs at £7 million p.a. represent 3 per cent of BBSRC's net science budget, and that BBSRC is one of the most efficient Research Councils.

A key performance indicator produced by BBSRC is the mean annual cost of processing a project research grant application. This currently stands at £380 per annum, the annual cost of administering a research grant when awarded being £56 per annum. The corresponding cost of administering a fellowship is not recorded, but will be greater due to the additional costs of interviewing candidates and monitoring progress.

(b) a comparison of the characteristics of your schemes, for example career breaks and mentoring

For purposes of comparison, the various features of the three BBSRC fellowship schemes are set out below:

(i) *BBSRC David Phillips Fellowship*

Up to 10 David Phillips Fellowships are available each year tenable at UK universities and BBSRC sponsored institutes.

Applicants must be postdoctoral scientists engaged in non-permanent research posts with no more than five and a half years active postdoctoral research experience at 1 October in the year in which they submit an application.

Applications are also considered from candidates who meet the above criterion but who are also:

- currently employed in industry. Proposals are handled with maximum flexibility, and arrangements for joint funding by the current employer and the Council are possible;
- temporarily residing overseas who intend to use the fellowship as a means of re-establishing themselves in this country;
- wishing to use a BBSRC David Phillips Fellowship to re-establish themselves after a career break or other period of absence from active research;
- in non-permanent posts seeking a flexible working arrangement (eg part-time). With such awards, the time devoted to the research must be equivalent to at least 50 per cent of a normal full-time working week. The value of an award under flexible working arrangements would be on a *pro rata* basis.

BBSRC David Phillips Fellowships are normally awarded for a period of up to five years, subject to satisfactory progress.

The fellow's starting salary will be awarded at spine point 13 of the academic RAII pay scale (currently £26,491). The funds awarded include provision for future salary increases, and an annual revaluation based on Government's revaluation indices.

BBSRC David Phillips Fellowships provide a support grant, up to a maximum value of £200,000 over the five-year period of the fellowship, to defray the costs of the research that is to be undertaken including technical support, equipment, consumables and travel.

In addition to the support grant, BBSRC David Phillips Fellows are eligible to apply, through their employing institution, for research grants from BBSRC or other grant-awarding organisations.

David Phillips Fellows may be supervisors on BBSRC studentships. However, in doing so the fellow must be in a position to provide supervision of the student for the full duration of the award.

David Phillips Fellows may undertake up to an average of six hours' teaching per week (inclusive of all preparatory work and related examination duties) during university terms, provided this does not hinder the progress of the fellowship research programme. Apart from this, and normal holidays, fellows must devote the whole of their usual working time to research. No other work may be undertaken during normal working hours, including consultancy and commercial work.

David Phillips Fellows are required to attend a half-day induction course arranged by BBSRC prior to, or at the start of, the fellowship.

Special arrangements apply if a BBSRC Fellow wishes to continue the award during pregnancy, and sympathetic consideration is given to the wishes of the Fellow. In addition Fellows may be take up to four weeks paid paternity leave.

Other considerations include:

- costs of caring;
- removal expenses;
- holidays;
- sick leave;
- medical insurance for overseas travel.

Terms of Fellowship Agreement.

When submitting an application for a BBSRC David Phillips Fellowship, both the applicant and the proposed host institution are required to give undertakings that they are prepared to abide by the provisions of a Terms of Fellowship agreement, in addition to the regulations, terms and conditions of the scheme.

BBSRC's commitments to holders of David Phillips Fellowships, the obligations of fellows, and the Council's expectations of the institutions which undertake to employ them during the tenure of the fellowship, are defined in the Terms of Fellowship agreement a copy of which is available on the BBSRC Website. The agreement sets out the respective responsibilities of the Council, its fellows and their institutions, and is intended to clarify the relationships between them. It is based on the premise that in scientific matters a BBSRC David Phillips Fellow will be treated by the institution in the same way as its established academic staff.

Full details are at Annex 1.

Mentoring Arrangements

BBSRC David Phillip's Fellows are assigned to a BBSRC mentor—a designated member of the Council's Committee on Studentships and Fellowships—-who will:

(i) provide an individual point of contact with the Committee, and an additional source of general professional and personal guidance outside the Fellow's host institution; and

(ii) keep a watching brief on the Fellow's research programme and report to the CSF to inform its monitoring of his or her progress (but not participate in forming or communicating any judgements, recommendations or decisions relating to the Fellow made as part of the Committee's formal assessment and feedback process.

(ii) *BBSRC Research Development Fellowships*

Up to six Research Development Fellowships are available each year tenable at UK universities.

Applicants must be full-time established members of the academic staff of a UK university who have worked for a minimum of five years as at 1 October in the year in which they submit an application in their current or a similar post. Previous UK and overseas appointments will be taken into account, but applicants must have held an eligible appointment at their current UK institution for a period of at least one year at 1 October in the year in which they submit an application.

BBSRC Research Development Fellowships are normally awarded for a period of three years, subject to satisfactory progress. In exceptional circumstances, they may be extended for a period of up to two further years.

For the duration of the fellowship, BBSRC provides a grant of £30,000 per annum to the university which employs the fellow. Additionally the cash limited funds will include an annual revaluation on Government revaluation indices.

No research support grant is provided.

During the period of the fellowship, Research Development Fellows are expected to be relieved by their Department of all significant teaching and administrative duties. They may undertake up to three hours teaching and/or administration a week, provided that this does not hinder progress on research work. Apart from this and standard holidays, they are expected to devote their whole time to research, and no other work may be undertaken within normal working hours including consultancy and commercial work.

(iii) *BBSRC Professorial Fellowships*

Up to two Professorial Fellowships are available each year tenable at UK universities.

Applicants must have an established/permanent appointment in a UK university of industrial research organisation and must already be recognised as outstanding scientists at the international level.

BBSRC Professorial Fellowships are awarded for periods of up to five years, subject to satisfactory progress.

The fellow's salary is determined by the host institution. For the duration of the fellowship BBSRC will provide to the university which employs the fellow a grant of £55,000 per annum as a contribution towards the fellow's total salary costs. Additionally, the cash limited funds awarded will include an annual revaluation based on Government revaluation indices.

As part of the application for a Professorial Fellowship, the applicant may also apply for a grant, up to a maximum of £200,000 over the five-year period of the fellowship, to meet the costs of their research programme, including technical support, equipment, consumables and travel.

BBSRC Professorial Fellows are expected to be exempted by their institutions from significant teaching and related major administrative, consultancy and commercial commitments.

Arrangements for maternity and paternity leave, costs of caring, removal expenses, holidays, sick leave and medical insurance for overseas travel parallel those of the David Phillips scheme.

(iv) *General*

All BBSRC Fellows are required to submit annual reports on the progress of their research under the fellowships.

Progress reports are assessed by the Committee on Studentships and Fellowships and feedback given.

At the mid-point of their fellowship, David Phillips Fellows are required to personally present their work to members of CSF. They are questioned about their work and progress, and oral feedback given at the time, followed by written confirmation of the Committee's assessment.

All BBSRC Fellows are required to attend a biennial BBSRC Fellows Conference. It provides fellows with the opportunity of meeting other BBSRC Fellows as well as members of CSF, other members of BBSRC's Boards and Committees and senior members of BBSRC.

(c) an explanation of how schemes deal with applications for interdisciplinary research

Applications for BBSRC fellowships are considered by BBSRC's Committee on Studentships and Fellowships. Membership of the Committee is drawn from BBSRC's academic and industrial community against guidelines of expertise as set out in Annex 2. In its assessment of fellowship applications, the first requirement is that the quality of the applicant is of a suitably high level expected for a BBSRC fellowship. As with research grant applications, fellowship proposals are sent to appropriate external referees for an assessment of the science programme.

3. OTHER FELLOWSHIP SCHEMES SUPPORTED BY BBSRC

Royal Society Industry Fellowships

BBSRC is a partner in the Royal Society Industry Fellowships Scheme. This scheme, aimed at enhancing communications between industry, universities or equivalent and BBSRC-sponsored institutes in the UK, provides opportunities for post-doctoral employees in either sector to spend a period in the other sector:

- academic scientist or engineers would work in an industrial environment and undertake a project;
- industrial scientists or engineers would undertake research or course development at a university.

Daphne Jackson Memorial Fellowships

These are two-year awards, designed to facilitate the return to research of able engineers and scientists who have taken a break for family or other reasons. The Fellowship Trust acts as a link, selecting fellows and matching them with universities and research institutes where they can update their skills and carry out a research or development project.

June 2002

APPENDIX 5

Memorandum submitted by the British Computer Society (BCS)

1. INTRODUCTION

1.1 The British Computer Society (BCS) is the UK's Chartered Engineering Institution for Information Systems Engineering, with over 38,000 members worldwide. It represents the largest body of practitioners in Science and Engineering in the UK, and a rapidly growing area of the UK economy.

1.2 The BCS welcomes the opportunity to give evidence relating to the activities of the Royal Academy of Engineering (RAEng) and the Royal Society (RS).

2. ACTIVITIES OF THE ROYAL SOCIETY AND ROYAL ACADEMY OF ENGINEERING

2.1 The RAEng and RS run a number of valuable programmes for the Scientific and Engineering community. They both support programmes including:

- Research Professorships;
- Research Fellowships, at various levels;
- Travel Grants.

2.2 However there are some distinctive activities, eg the RAEng supports:

- industrial secondments for academics;
- engineering awareness activities for 14-28 year olds (eg Head Start).

2.3 Similarly the RS has its own distinctive activities, eg direct funding for research projects, and programmes on public understanding of Science. It has funded important and relevant research, eg on quantum computing.

2.4 All these activities are worthwhile, and we would not wish to see them curtailed. We are particularly positive about the RAEng's schemes for supporting exchange between Universities and industry, as we believe this encourages better understanding between the two communities.

2.5 The two bodies also have an important role in advising the Government, and in promoting public understanding of Science and Engineering. We feel that the two bodies are less effective in these areas, and there remains a need for more effective effort to communicate with Government and the public. For example, both bodies need to do more to promote interest in Science and Engineering in schools, to ensure that the UK retains its historic strengths in Science and Engineering, with the concomitant contribution to quality of life and economic health of the Nation.

3. REPRESENTATION OF MODERN AREAS OF SCIENCE AND TECHNOLOGY

3.1 Despite our generally positive views of the RAEng and RS, we are very concerned about the poor representation of modern areas of Science and Engineering. As a consequence the RS and RAEng are not in a position to offer adequately informed advice to the Government, in key areas.

3.2 We would include topics such as Systems Engineering, nano-technology, and bio-informatics, in a list of "modern" areas of Science and Engineering. However we will focus on computing, as that is the BCS' area of expertise.

3.3 It is very difficult to find out precisely how many Fellows of the Royal Society have computing as their primary discipline. The Royal Society has advised that the number is 11, although we believe the number to be closer to 20. We would not question their pre-eminence, just that there are so few. By way of illustration, there are 1600 research active academics in computing, based on the last RAE. Physics and Computer Science have similar proportions of 5/5* Departments and one would expect to see proportionately similar representation in the RS. On this basis 80 Fellows of the RS ought to be primarily in computing research.

3.4 One of the factors which has a heavy influence on the admission to the RS are the criteria for each panel. There is no panel for computing, and those who succeed need to be admitted through the mathematics, physics or engineering panels. There has been a recent International Review of Computer Science undertaken by Engineering and Physical Sciences Research Council (EPSRC). The Report of the findings contains a valuable description of what distinguishes Computer Science as a discipline. The RS may find this helpful in ensuring it has relevant criteria when assessing distinction in computing.

3.5 We are aware that the RS has recently asked University Vice-Chancellors to nominate staff from "under-represented" subjects, but there is an urgent need for more direct action to address the representation of computing.

3.6 The RAEng has a rather better representation, with 29 Fellows who are Members or Fellows of the BCS. There are perhaps 100 more who have some involvement in computing; however the vast majority of these use computers to support work in their core disciplines, rather than being computing professionals.

Thus there are similar problems of under-representation of computing in the RAEng, although not as extreme as in the RS, and the RAEng is addressing the issue, eg by soliciting nominations from the BCS.

3.7 Our concern is not that there should be representation of computing purely to achieve "parity". However, the RS and RAEng cannot carry out their responsibilities effectively for advising the Government, nor for improving public understanding of computing issues, if they lack adequate access to the expertise. It is essential the two institutions retain their rigorous standards, but adapt their procedures to better reflect the very rapid changes in the emerging disciplines. We are concerned that there is not enough "critical mass", particularly in the RS, to rectify the under-representation of computing by natural evolution in a fast changing world.

4. Balance of funding for the Royal Society and Royal Academy of Engineering

4.1 The RAEng and RS receive about £4 million and £25 million per annum from the Government's Science budget, respectively. We believe that the RAEng gives very good value for money, supporting a comparable level of activity to the RS. Thus, the disparity in funding between the two bodies does not seem justifiable.

4.2 The work of the two bodies is very important so we would not wish to see a reduction in their activities. Thus we think it essential that the funding for the RS is preserved, and that for the RAEng is increased, particularly for schemes which support interaction between industry and academia.

5. Conclusions and Recommendations

5.1 In conclusion we commend the work of the RS and RAEng in supporting Science and Engineering in the UK and advising the Government. Our major concern is the small number of Fellows of either body who represent computing or other "modern" subjects. Also, we observe that the RAEng provides much better value given the level of support from the Government.

5.2 Thus we recommend:

(1) The level of funding for the RS is preserved, but the funding of the RAEng is increased substantially; and

(2) Both bodies are asked to put in place (or strengthen) programmes to draw in members from "modern" disciplines, and as a matter of urgency in computing. A review of membership should be held after three years and the level of funding for the bodies reconsidered if no significant increase in numbers from the "modern" disciplines has occurred in this time.

5.3 We recognise the need to ensure that the high standards of membership of the RS and RAEng are maintained. The BCS is willing to give more support to the two bodies in identifying and assessing candidates of sufficient standing. Alternatively, or in addition, it may be simplest to ask each 5/5* rated Computer Science Department to nominate two or three Fellows to the RS, to "pump prime" the growth in numbers—the international standing of the members of those Departments is already established.

April 2002

APPENDIX 6

Supplementary memorandum submitted by the British Computer Society (BSC)

Evidence to the Select Committee

As requested when we gave evidence to the Committee on 12 June, we have investigated the difference between the BCS' and the Royal Society's statements on the number of computing Fellows of the Royal Society. The attached list is the result of a search through the list of Fellows on the Royal Society's website. Even getting up to 20 has required us to be rather generous in the definition of the scope of computing including, for example, someone working in nanotechnology. We realise that our manual search of 1200 names is error prone, so we may have missed some people working in our field, but we would be surprised if we have missed 30. However, we would be very happy to review and comment on the Royal Society's list of 50 Fellows, if that would help you.

We think it is to the advantage of the Society, the computing community, and the government to encourage the Royal Society to find ways of accelerating the growth of its Fellowship in computing. Without a substantial change in the Fellowship we do not see how the Royal Society can give you authoritative advice in the field of computing.

We can see several ways of assisting this process. Firstly, the BCS works with the Royal Academy of Engineering, making nominations for Fellowships each year. This has been effective in growing the number of computing Fellows in the Royal Academy. We would be happy to support the Royal Society in a similar way.

Secondly, we note that the Royal Society of Edinburgh realised some years ago that it had poor representation in a number of disciplines, including computing, and found it necessary to introduce a new committee to deal with computing in its own right. Whilst it is not for us to say how the Royal Society should manage its internal affairs, it is hard to see how the situation will improve whilst it assesses computing from the standpoint of traditional engineering (committee 4) or mathematics (committee 1). The absence of a "pure" computing committee is perhaps all the more surprising as computing was second only to physics in the number of active researchers reported in the last RAE, ie it is the second biggest research community in the country.

Fellows of Royal Society in Computing: Assessment by the BCS

These are Royal Society Fellows whose core activity is in Computing. This includes three overseas Fellows, and one in nano-technology which must be considered the "periphery" of the discipline. Three are firmly in micro-electronics. Five or six are at the theoretical end of the discipline, the rest are more applied in their work, or are in more administrative positions.

1. Tim Berners-Lee
2. Michael Brady
3. Stephen Furber
4. Michael John Caldwell Gordon
5. Geoffrey Everrest Hinton, Toronto
6. Charles Antony Hoare
7. John Vincent McCanny
8. Michael David May
9. Arthur John Robin Gorell Milner
10. Roger Michael Needham
11. Professor Bernhard Hermann Neumann, Australia
12. Michael Stewart Paterson
13. Stuart Parkinson
14. Gordon David Plotkin
15. Martin Nicholas Sweeting
16. John Michael Taylor
17. Valiant Leslie Gabriel, USA
18. Mark Edward Welland (nanotechnology)
19. David John Wheeler
20. Maurice Wilkes

June 2002

APPENDIX 7

Memorandum submitted by the British Ecological Society

1. The British Ecological Society (BES) welcomes the opportunity to provide evidence to the Committee and notes that a two-month period has been provided for the consultation, in line with government guidelines.

2. The BES is the oldest ecological society in the world having been established in 1913. Since 1980 it has been a charitable company limited by guarantee. Membership is open to all those who are genuinely interested in ecology, whether in the British Isles or abroad, and membership currently stands at 4,200, about half of whom are from overseas. The members are employed in a wide variety of professional capacities including academics, environmental scientists in government and industry, biology and geography teachers as well as environmental consultants and planners.

3. The Society's income is entirely derived from membership subscriptions, the sale of its learned journals and investment income. The Officers of the Society are elected by the membership, and unpaid except for small honoraria for editors. The Society maintains a London office with five staff headed by an Executive Secretary to administer the Society's many activities. Around 25 per cent of the income is spent on administration.

4. The BES receives no government funding in any form. Besides publishing scientific journals it runs educational projects, supports ecological expeditions overseas and provides small grants for ecological studies world-wide. In recent years the Society has also been publishing a range of educational booklets for

the public and policy makers on topical ecological problems such genetically modified organisms, fisheries management, land management and the CAP, the destruction of coral and water quality.

5. The Public Affairs Committee of the BES is responsible for organising and providing independent scientific comment on government green papers and departmental policy documents. It undertakes such activity where the subject matter is of sufficient interest from an ecological viewpoint and when adequate time is allowed for consultation—sadly Departments often abuse this latter point. In many recent cases the BES has chosen to make a joint reply with other interested learned societies through the Institute of Biology.

6. The Society has recently established a web site (www.britishecologicalsociety.org) through which it intends to increase its communication with the public interested in ecology and its application, and establish a more vibrant internal discussion between its members on areas of topical concern.

7. The Society is a member of the Parliamentary and Science Committee and attends those meetings with an ecological component. The Society is also represented at the Environmental Audit Committee.

8. The BES considers that good policy making requires informed judgements and in respect of science it seems unfortunate that so few members of Parliament have an adequate scientific background in a society that is science and technology based. Looking to the future the BES is concerned that government has so far made inadequate efforts to place sustainability as a core requirement of all policymaking in all Departments. Despite some positive indications, such as enthusiastic support for the Kyoto agreement and the Darwin Initiative, there is little evidence of adequate understanding of the need for hard choices if the environment and the quality of life are to be protected for future generations.

9. A more effective interaction between the scientific community and the public would benefit both and provide Government with a more informed electorate. However, MORI polls show that government scientists are believed to be less trustworthy than NGO scientists, who frequently lack both the data and the qualifications to speak with authority. Yet the government's manipulation of the scientific findings of those employed in the Civil Service and the Agencies has been a major element in spreading distrust of science and its findings. Many learned societies, who could be providing an independent voice in these affairs, have also considered that they should not become involved in scientific discussions that develop overt political or ethical overtones, thus depriving the public of independent and reliable information and leaving the field open to misinformation provided by overtly political groups. The Royal Society, as the premier scientific society in the UK, has been attempting to provide leadership here, but unfortunately (as with other learned societies) too often in recent years its input has been too late, and too inaccessible for the public to understand.

10. The BES would contend that improvements in communicating science to the public are not simply linked to the provision of finance. The publication of "Open Channels" by POST in March 2001 provided a good summary of the forms of dialogue and experiences up to that point with using them. The latest OST initiative, moving the focus away from talking at the public to discussing the options with the public, is a clear lead in the right direction but will not be simple or cheap to implement. A more scientifically literate electorate, both inside and outside Parliament, is what is required but it will take some time to achieve. In the mean time government should actively promote policy discussion, avoid suppressing ecological and environmental information produced by government labs and instead take the opportunity to explain publicly what it means. Continuing encouragement for learned societies to provide input to policy making through consultations and workshops is also welcome.

11. One continuing problem is the expectation of certainty in advice. By its very nature science can only provide advice based on the most probable conclusions from the existing data. Despite the comments from some politicians, it is clear that the public can understand uncertainty in a particular framework, as the record receipts in the betting industry show, but the concept seems to be difficult for the public and government to grasp in the context of science. Ministers in particular should be active in developing the recognition that scientific uncertainty must be accepted as a normal part of decision and policy making, and that it is in many respects much more reliable than the economic forecasting with which government can apparently deal.

12. There is a long way to go to achieve the goals outlined above. The BES recognises that science is only one element in policy making but in a complex technological society such as ours it merits special attention. The BES hopes that the outcome of this investigation will provide some new incentives and suggestions that will help reduce public disquiet at science, increase the level and quality of public debate and recognise the importance of good environmental management in ensuring an adequate quality of life for future generations.

April 2002

APPENDIX 8

Memorandum submitted by the British Pharmacological Society

INTRODUCTION

The British Pharmacological Society is the primary learned society in the United Kingdom for pharmacologists, and one of the most prominent in its discipline in the world. Pharmacology is the science of how drugs work. It is different from pharmacy, which is concerned with the provision of medicines to the public. Pharmacology is a fundamental discipline in the development of new and improved drugs to save and improve the quality of life, both human and animal, throughout the world. Pharmacologists work "from bench to bedside": in other words from basic molecular and cellular research on the mechanisms of health and disease though the pre-clinical and clinical development of new drugs for specific conditions to the monitoring of reactions to drugs which are in widespread use and the optimisation of prescribing practice in hospitals and primary care. The Society has 2,650 members in 30 countries, working in academia (research and teaching), industry, the medical profession and regulatory authorities. The Society is a charity and a company limited by guarantee. A copy of the Society's 2000 Annual Review is enclosed.

Government Funding

Like the great majority of learned societies, the British Pharmacological Society does not ordinarily receive any Government funding. Its funds are self-generated, and are used on its objective of promoting and advancing pharmacology, including clinical pharmacology. The Society has a small administrative staff, but all its scientific work is done on a voluntary basis, by members who work for the good of the discipline. The funds, which are generated primarily from membership subscriptions and by the publication of two primary research journals (both peer reviewed and edited on a voluntary basis), are used to fund scientific meetings, careers information, PhD studentships and other support for the discipline (for example facilitating exchange of information about teaching and research between university departments in the UK through the Committee of Heads of Pharmacology and the Committee of Heads and Professors of Clinical Pharmacology and Therapeutics).

The Government funding provided to The Royal Society is of enormous value to scientists, including pharmacologists. Many academic departments have benefited greatly from The Royal Society's Research Fellowship Scheme, which provides much needed stability of funding for talented young researchers for up to ten years, enabling them to establish their own research laboratories. The Royal Society also assists scientists in attending important overseas conferences, and in organising scientific meetings in the UK that are important for the prestige of the national science base and for attracting foreign scientists to work in the UK or collaborate with UK scientists. In this context, we regret The Royal Society's decision to stop underwriting the organisation of International Congresses in the UK. This decision, which we understand to have been the result of a reduction in real terms in The Royal Society's Grant-in-Aid, has made it almost impossible for such Congresses to be held in this country, except where the relevant national society is very large or very wealthy, as most learned societies cannot carry the financial risk involved in organising these major events. This will inevitably have a detrimental effect on the global prestige of UK science.

The only occasion on which the British Pharmacological Society has received Government funding was when it was one of the winners of a competition for matching funding for a web site project—the Professional Institution Network Challenge (run by the Department of Trade and Industry). In 1998-99 £20,000 was received to match the same level of expenditure by the Society on developing a web site for the use of the pharmacology community. This site has since been superseded, but the funding was very valuable at the time. The BPS has also supported a number of consortia of academic institutions which have received Government funding via HEFC (the Teaching and Learning Technology Programme) for teaching initiatives such as the development of computer aided learning packages in pharmacology (pharma-CAL-ogy). The Society has used its own funds to provide the infrastructure for meetings associated with these initiatives, and to publicise them and the resulting products through its members' publications, web site and its Educational Resources Centre. In addition, the Society has taken over the initiatives when the Government funding came to an end, to ensure that the benefits continue to be made available to the pharmacology community.

Advice to Government

The Society does provide advice to Government, both by responding to consultations, and by raising issues it believes to be important to the future of pharmacology. In addition, members of the Society serve on Government advisory committees such as the Committee of the Safety of Medicines and the Medicines Commission. We work collaboratively with other societies, with groupings like the UK Life Sciences Committee, and with other relevant bodies such as The Royal Society, the Academy of Medical Sciences, the Association of the British Pharmaceutical Industry, the Research Defence Society and the Association of Medical Research Charities as appropriate. In recent years we have been particularly involved with providing advice to Government on the vital importance of research using animals, and how the environment for this kind of research in the UK can be prevented from deteriorating. We believe that advice from learned societies can be of great value to the Government, as it is demonstrably both expert and independent.

Information to the Public

Over the past few years the Society has become increasingly involved in promoting pharmacology, and science in general, to young people who are making examination subject and career choices. Like most scientific societies we provide careers literature giving information about what pharmacology is, what pharmacologists do, what the career opportunities are and how to enter a career in the field. We also attend careers fairs, and individual members of the Society go out to schools in their areas for careers days, and also to give lectures on the subject. Society members have also placed their names on the www.biology4all web site, where teachers can search for speakers in their local areas. The Society also provides careers information and general information on pharmacology on its own web site (www.bps.ac.uk).

The Society also has a referral service for journalists who are writing about drugs, providing them with contacts with specialists in the relevant field, to help to improve the accuracy and quality of information on drugs in the general press.

One aspect of learned society activities that should not be underestimated is international liaison. Discipline based learned societies are part of international networks in their disciplines, and members act as ambassadors for UK science when they visit overseas countries on Society funded lecture tours. The British Pharmacological Society funds two such schemes, one for exchanges between the UK and Australia/New Zealand, and one for Society lecturers to visit India. In addition a UK-Scandinavian lecture exchange is funded through the BPS by a pharmaceutical company. The Society also provides the UK representation in three international federations of pharmacology—the International Union of Pharmacology (IUPHAR), the Federation of European Pharmacological Societies (EPHAR) and the European Association of Clinical Pharmacology and Therapeutics (EACPT). The Society pays the full subscription for the latter two, and 51 per cent of the subscription for IUPHAR, the remaining 49 per cent being contributed by The Royal Society. These federations are particularly important to nations in the developing world and in eastern Europe, where the number of pharmacologists is smaller and the provision of a focus for international interaction therefore even more important.

The Society also provides support to pharmacology teachers in higher education in a number of ways. It has developed core curricula in pharmacology both for pharmacology BScs and for the pharmacology content of other relevant courses, and these are freely available on the Society's web site (www.bps.ac.uk). A few years ago, the Society identified a serious risk that the teaching of in vivo pharmacology to undergraduates would completely disappear, because of the increasing costs and the reduction in the number of academics with the necessary skills to teach it. With generous help from the pharmaceutical industry, the Society has established a grant scheme for new courses in *in vivo* pharmacology and those under threat of closure for financial reasons, and now supports courses at eight universities. In addition, together with the Physiological Society and again with generous support from the pharmaceutical industry, we have established two short vacation courses for students who are interested in the subject and who have not been able to undertake *in vivo* work at their own institutions. Without the Society's detailed knowledge of the position in universities and the pharmaceutical industry, and its ability to co-ordinate different parties and act as a respected broker, it is unlikely that these schemes would have been established, and *in vivo* pharmacology would have deteriorated further. Societies in other disciplines will no doubt have similar experiences to report.

GENERAL

Scientific societies are a very important part of the infrastructure for science. They provide a focus for the enthusiasm and commitment of their members, whose voluntary effort would be most unlikely to be channelled in any other way. Most societies run entirely on self-generated funds and primarily by voluntary effort, although many (but by no means all) have small administrative staffs to ensure that their members can concentrate on scientific matters. There is scope for scientific societies to work together on issues that affect all of them, and the UK Life Sciences Committee has been very effective in bringing a group of societies which have very similar interests together in this way. However, we believe that discipline based societies are still needed, as they generate a loyalty and sense of identity in their members which is difficult to reproduce in larger, more amorphous bodies. The visibility of scientific disciplines varies over time. Pharmacology is a good example. A few years ago, molecular biology was the focus, and pharmacology received less attention. Now, however, pharmacologists, and especially *in vivo* pharmacologists are in demand, because of the need to find out what the compounds identified by molecular biology techniques as possible therapeutic agents actually do in the whole organism. Without a dedicated pharmacological society to promote the discipline, recruitment to and teaching and research in pharmacology could have deteriorated to the point where the country's research base could have suffered serious damage.

We believe that learned societies in general make a vital contribution to the scientific infrastructure of the United Kingdom, at a very low cost to the Government (and in the case of most discipline based societies, at no costs at all). Scientists need means through which they can communicate their work formally; informal networking opportunities that allow them to exchange ideas with peers and to develop collaborative ventures; opportunities to train students in the techniques of formal and informal communication of their research; sources of recognition by their peers. Learned societies provide all these things through their scientific meetings, journals, travel grants, student grants, prize and award schemes etc., and at no direct cost to the tax payer. There has been some speculation about the possibility of removing charitable status from learned societies, but we would argue very strongly against this—without the tax concessions which learned societies currently receive, many would be unable to continue to make their current contributions to the nation's science infrastructure, leaving the taxpayer with a big gap to fill.

April 2002

APPENDIX 9

Memorandum submitted by the British Psychological Society

1. As the learned society for psychology, The British Psychological Society, under its Royal Charter, promotes the advancement and diffusion of knowledge of psychology pure and applied. As well as setting and maintaining high professional standards for psychologists, the Society exists to bring the insights gained from psychologists' research and practice into the public realm for the benefit of all.

2. The Society welcomes this opportunity to contribute to the inquiry into the government funding of the scientific learned societies and applauds the interest of the committee in the quality of scientific advice available to government which this inquiry demonstrates.

3. The Society believes that government policy should be based on the best available scientific evidence. We recognise the importance of contributing to the policy making process and devote considerable resources to making psychological expertise available in Whitehall and Westminster.

4. All parts of government should welcome to contribution of science to evidence-based policy making. The existing support for learned societies and other learned bodies should be regarded as a base from which the contribution of science to political and public life must be developed.

5. Among the Society's 34,000 plus members is a wealth of expertise on issues of concern to many different government departments. There is a particularly strong history of input to science, health and education policy. In the past two years, the Society has responded to 20 UK government consultations, 27 consultations by other bodies and provided members for departmental working or consultative groups. In addition, the Society publishes research which informs policy making, meets with Ministers and works closely with POST on individual research projects. The estimated cost of this work, to the Society, which is not financially supported by government, is in excess of £15,000.

6. However there are many parts of government that do not make full use of the scientific advice which psychologists could offer. Transport, criminal justice, work and pensions, trade and industry, defence, food and rural affairs and housing policy would all benefit from research which has been conducted by psychologists. That policies are being made in these areas without recourse to the best evidence available is disappointing.

7. The Society intends to promote the contribution of psychologists to policy making across departments. It is our belief that a co-ordinated approach by our members to government would add value to the work of individual psychologists and government departments as well as the science base and government as a whole.

8. Relations between the scientific and research communities and government should not be confined to the policy silos within which these interactions have traditionally occurred. The Society hopes that broadening the range of psychologist/government interactions will make a positive contribution to the efforts of the OST and the Chief Scientific Advisor in raising the profile of science across Whitehall.

9. The Society endorses the view of the Secretary of State for Trade and Industry (expressed in her evidence to the committee on 19 December 2001) that those who understand the importance of the science base must make the case for government spending on science and believes that this responsibility will endure beyond the current spending review.

10. In the interest of broadening the base from which advice to government is drawn, the Society would welcome some financial support for input to one-off inquiries being made available to organisations that do not receive grant-in-aid from the government.

11. Within the last five years the time allowed for responses to government consultations has shortened considerably. Whereas before there might have been three months plus, the time scale now may be as short as a few weeks. Our members' responses are produced on an entirely voluntary basis; attempting to persuade them to drop existing work commitments at short notice to draft a response to government is becoming increasingly hard. Government should recognise that those with the greatest expertise are likely to have the busiest schedules and plan its consultation process accordingly.

April 2002

APPENDIX 10

Memorandum submitted by the Chartered Institution of Water and Environmental Management (CIWEM)

1. INTRODUCTION

1.1 The Chartered Institution of Water and Environmental Management (CIWEM) is the pre-eminent independent professional body and learned society for an integrated approach to environmental management. We have a global membership comprising scientists, engineers, ecologists, biologists, managers and environmental professionals from many other disciplines. CIWEM members play a key role in achieving the goal of a sustainable environment and the advancement of environmental affairs—they are required to conform to this Institution's Code of Environmental Ethics. CIWEM is a constituent body of the Science

Council and services the Science Council's "Science in the Environment Group". This Institution is also a "Nominated Body" of the Engineering Council UK and licensed to award the qualification and designation "Chartered Engineer". We are one of a small but unique group of professional bodies that embraces both science and engineering disciplines. CIWEM is currently engaged in the establishment of an umbrella body of environmental institutions and learned societies and we are in discussion with the Privy Council about a Royal Charter for this new body.

1.2 This Institution was founded in 1895. It is a registered charity and is funded through membership subscriptions and income from conferences, sale of publications, donations and training initiatives etc. CIWEM does not receive any form of direct Government funding and is entirely self financing.

1.3 This Institution welcomes the Science and Technology Committee's Inquiry into the funding of Scientific Learned Societies. We hope that it will lead to a more transparent, rational and equitable approach to future funding as this has been a matter of concern to CIWEM for some time. This Institution is pleased to offer this text as CIWEM's contribution to the Committee's Inquiry and we would be pleased to give oral evidence if invited to do so.

2. Summary

2.1 CIWEM urges Government to continue funding independent Learned Societies (but refrain from the "patronage" of a select few). They perform an important role in society, regulate the professions they serve and are an authoritative source of objective advice.

2.2 CIWEM urges Government to review the regime and criteria for funding Learned Societies and to create a new funding framework. Such framework to take account of:

(a) the extent to which a body is financially sustainable and self supporting;

(b) a body's policies in relation to inclusivity, gender, race, age, sustainable development and ethical behaviour.

2.3 CIWEM takes the view that funding criteria should be based on principles of "additionality" with Government funds supporting new work and not the core activities or overheads of a Learned Society.

2.4 CIWEM believes that funding should be conditional and justified by a three or five year Business Plan. The Plan should include targets, performance indicators and a methodology that will enable Government to assess performance against the Plan and the achievement of value for money, annually.

2.5 CIWEM urges Government to consider a much broader range of Learned Societies for allocation of funds using a set of criteria which is fair, open and transparent embracing value for money tests.

2.6 CIWEM urges the Government to support and incentivise closer collaboration between Learned Societies that share a common remit—in particular the emergent over arching body for environmental institutions (currently operating under the working title of the "Chartered Umbrella Body for the Environment"—CUBE) and the Science Council.

2.7 Learned Societies with a Royal Charter must demonstrate that they are meeting their Charter commitments to qualify for Government funding.

3. Issues

3.1 In considering CIWEM's position on the funding of learned societies this Institution has identified three key issues. These are:

(a) The Role of Learned Societies—affirmation;

(b) Government Funding—a framework;

(c) Learned Societies—the case for widening access to Government funds.

3.2 For the purposes of this evidence CIWEM's definition of "Learned Society" includes any independent learned society or professional body that is either a registered charity or holds a Royal Charter or, of course, is both a charity and holds a Royal Charter. We specifically exclude those bodies which hold political or commercial affiliations.

4. The Role of Learned Societies

4.1 Learned Societies and professional bodies perform a unique role. The majority are independent of political and commercial interests and rely on the voluntary efforts of their members who do what they do for altruistic reasons. They care about their profession and are committed to the common good. Therefore, these learned bodies play a critical role in providing independent expert advice to Government and others, regulation of the profession and professionals they serve, education and training, professional development, research and much more besides. They provide a platform for objective debate on the critical scientific and technological issues of the day and the very best are forward thinking, providing innovative solutions to pressing social and scientific needs. CIWEM suggests that if Learned Societies did not exist they would have to be invented or, Government itself would have to perform many of the functions they now provide.

4.2 CIWEM is aware that successive Governments have expressed a view that there are too many bodies serving similar professional interests leading to conflicting advice and duplication of effort. The need for closer collaboration of Learned Societies to create a single authoritative voice has, to some extent, been heeded and there is now a Science Council which acts as an over arching-body for science-based Learned Societies and professional bodies. Launched by Science and Innovation Minister, Lord Sainsbury, in 2000, it is anticipated that the Science Council will fulfil its objective and become a respected and authoritative voice for the science community on cross cutting scientific issues. Similarly, CIWEM is currently working with nine other environmental institutions and Learned Societies to create a federation for the breadth of environmental affairs and disciplines. Our aim is to co-ordinate our activities and speak with authority to Government and the public on environmental affairs. This is an initiative which has been widely welcomed across Government, by the Environment Agency, employers and the environment profession at large. The Steering Group driving this development aspires to create a new designation of "Chartered Environmentalist", or similar designation, for appropriately qualified and experienced environmental practitioners.

4.3 Initiatives that lead to collaboration between Learned Societies are to be applauded. They deserve Government support since it is Government that will be a key beneficiary. The process by which Government is informed and advised, under such arrangements, will rationalise the consultation and advisory process. CIWEM urges the Government to consider incentivising any cluster of Learned Societies, that share common aims and objectives, in order to encourage them to co-ordinate their activities.

5. A Framework for Government Funding

5.1 CIWEM believes that Government should continue to fund Learned Societies—many of them continue to make a tremendous contribution to the health, wealth, culture and standing of this country. They also make a significant contribution to the advancement and application of science and engineering for the public benefit. Much of this excellent work is undertaken by members of Learned Societies on a voluntary basis and CIWEM believes that so much more could be achieved if some of the available (or any additional) funding was directed to those bodies who currently do not benefit from Government support. That only a select few Learned Societies receive Government support represents an opportunity lost. CIWEM believes that there is an urgent need to review the current funding structure and to establish a new framework for funding based on merit, value for money and sound management principles. For example, funded bodies should demonstrate that they are inclusive and have policies in relation to gender, race, disability and age. They should also show that they are committed to sustainability and operate within an acceptable Code of Environmental and Social Ethics. Such bodies should be open and inclusive committed to outputs and outcomes which serve the public good and known social priorities.

5.2 Government funding should be conditional and relate to a prescribed programme of activities, targets and performance indicators which show how a funded body is contributing to innovation, excellence and a better public understanding of science and engineering. We also advocate that a Learned Society be required to submit to Government a three or five year Business Plan justifying initial and continued funding. Such bodies should report, annually to Government, on actual performance against the Plan.

5.3 Those bodies, like CIWEM, which carry a Royal Charter should also be able to demonstrate total compliance with the terms of their Charter in order to qualify for Government funding.

5.4 CIWEM understands that, in any new framework for the funding of Learned Societies, Government may not wish to underwrite core activities and overheads. This Institution certainly believes that such bodies should be self financing and that Government funding should be provided on the "additionality" principle. That is, funding should support projects and initiatives that a Learned Society could not otherwise fund from its own resources but for which there is a demonstrable need. Government funding of these "value added" projects should, by definition, lead to innovation and better practice, have measurable outputs, be demand led, meet social priorities and offer better value for money than the current funding arrangements.

6. Widening Access to Government Funds

6.1 Currently, only a small proportion of Learned Societies receive Government funding. This seems to be based largely on historical practice and discounts the potential of many other Learned Societies to contribute to social and Government priorities. Many of the bodies that do not receive Government funding could easily make a case for doing so. The fact that there is no obvious mechanism for accessing available funds is unfair. It discriminates against those Learned Societies with an excellent track record of achievement in favour of an elite few who are effectively "subsidised" by the taxpayer and who do not necessarily represent the views or activities of other bodies.

6.2 The current funding regime is not only discriminatory it is exclusive in nature and should be changed. It perpetuates a tradition which is no longer relevant in a modern more accountable world where greater transparency is, or should be, the norm. The Government funding and "patronage" that certain bodies now enjoy may have been appropriate one and two hundred years, or more, ago but a modern world with a different ethos and culture demands that the reasons for continuing with that approach are vigorously tested. Other learned bodies must be allowed to make their case. This is basic good public governance and should be regarded as part of the modernisation of Government.

7. CONCLUSION

7.1 CIWEM applauds this Inquiry—we believe that it is long overdue. We urge the Government to continue to fund Learned Societies but within the context of a new funding regime and framework. This Institution advocates a system which is modern, inclusive, transparent, encourages outputs that meet social priorities and recognises the potential contribution of all Learned Societies to the improved health, culture and economy of this country.

7.2 In supporting a new and fairer funding system for Learned Societies we advocate that such funds should not be used to underwrite a body's core activities or overhead costs. We firmly believe in the principle of "additionality" with funds being used for specific initiatives that are relevant to social and Government objectives and that a body would not otherwise be able to undertake. All bids for Government funding should be supported by a Business Plan showing measurable outputs.

7.3 Finally, CIWEM urges Government to encourage those Learned Societies, that share common aims and objectives, who wish to work co-operatively in clusters or partnerships. It is in Government's interest that Learned Societies come together and speak authoritatively with one voice and reduce the incidences of repetition and duplication of effort. The funding mechanism could be used to offer incentives for so doing and support, for example, the current initiative to bring together the many environmental Learned Societies and Institutions which exist.

March 2002

APPENDIX 11

Memorandum submitted by the Engineering and Physical Sciences Research Council (EPSRC)

1. SUMMARY

EPSRC values its interactions with the key learned societies; we believe these interactions provide unique opportunities for EPSRC to deliver against our remit of supporting high quality research, provision of skilled researchers and promoting the public awareness of science, engineering and technology. The learned societies and professional institutions also provide EPSRC with an essential information and advice stream contributing to its policy and programme priority setting. Accordingly EPSRC has worked with many of them to develop formal memoranda of understanding.

EPSRC works collaboratively with the Royal Society (RS), Royal Academy of Engineering (RAEng) and other learned societies and professional institutions where doing so satisfies the objectives of both organisations. The types of interactions include joint funding of fellowships, joint sponsorship of studies and seminars. Where any EPSRC monies are transferred to these organisations it tends to be that this is an arrangement adopted for administrative purposes only—the funds are used to address EPSRC mission objectives.

Further details of EPSRC's interactions are indicated in the following sections and financial details are provided in the Annex.

2. THE ROYAL SOCIETY (RS)

EPSRC's major interaction with the RS is as a co-sponsor of Industrial Fellowships, a joint venture with the RS, the Biotechnology and Biological Sciences Research Council and Rolls Royce. EPSRC is a major sponsor, since it provides us with a particularly effective vehicle for enhancing technology transfer between academia and industry and vice versa. The RS administers the scheme; EPSRC contributes £200k per annum and provides referees. Approximately eight fellowships are awarded a year over two calls (June and December). The awards, which cover salary costs, are held for up to two years and can be either full time or part time.

EPSRC has recently introduced a new scheme to fund "Research Chairs", with a contribution from the RS, although there has been no expenditure to date.

EPSRC also works with the RS to advance its objectives in the public awareness of science, engineering and technology. RS, the Particle Physics and Astronomy Research Council and EPSRC sponsor an annual series of media and public communications skills training courses at the level of around £5k a year.

EPSRC's Chief Executive meets annually with counterparts at the RS to review interactions. EPSRC Programme Managers and staff attend a number of events held at the Royal Society. The RS were a non-funding sponsor of the EPSRC International Review of Computer Science.

3. The Royal Academy of Engineering (RAEng)

EPSRC has strong interactions with the RAEng and together support a number of Chairs and Fellowships to encourage excellence in engineering research:

- Two Innovative Manufacturing Research Chairs. Each organisation makes its financial contribution directly to the HEI in question;
- Clean Technology Fellowships that aim to enhance the capacity of UK universities to carry out research in new technologies. Ten fellowships were established for a period of five years. RAEng administers the scheme on behalf of both organisations. The expenditure on these finishes in the current financial year;
- Over the past year EPSRC and the RAEng have worked together to establish a new Post Doctoral Research Fellowships scheme, which will commence in 2002–03 and over the next five years EPSRC will be contributing about £160k per annum for Post Doctoral Research Fellows.

In 1999 EPSRC and the RAEng jointly commissioned an international Review into the quality of engineering research in the UK. The review was chaired by the then President of the RAEng, and the administration was shared between both organisations.

EPSRC also sponsors a number of conferences and events organised by the RAEng where these events can provide us with valuable input to our business planning. We recently held a jointly funded evening meeting to discuss issues facing the engineering research community, majoring on multi-disciplinary working and staff recruitment and retention.

Bilateral meetings take place every six months, involving EPSRC's Chief Executive, accompanied by the engineering Programme Managers. There are also ongoing working level interactions.

4. The Learned Societies and Professional Institutions

EPSRC also has formal memoranda of understanding and good working relationships with a number of learned societies and professional institutions that are representative of particular disciplines within EPSRC's remit. EPSRC's Programme Managers meet regularly with the learned societies or Professional Institutions most relevant to their subject areas (such as Royal Society of Chemistry, Institute of Physics etc.); on occasions they are accompanied by the Chief Executive. Particular importance is placed on securing comments on EPSRC's draft business plans as part of EPSRC's priority setting and business planning. EPSRC also works in collaboration with relevant learned societies and Professional institutions to stimulate research networks and provide specialist training opportunities or to encourage the public awareness of science, engineering and technology.

EPSRC is currently undertaking a rolling programme of International Reviews in collaboration with the relevant learned societies to benchmark the standard of research being funded in its portfolio. .

Some examples of EPSRC's interactions are given below:

4.1 *Input to Business planning and priority setting*

EPSRC Programme Managers place particular importance on obtaining inputs to their business plans from the relevant learned societies and professional institutions and in working with them to encourage research in areas of strategic importance. Some examples of the types of interactions are as follows:

- annual meeting with the Scientific Affairs Board of the Royal Society of Chemistry (RSC) to discuss future plans for EPSRC Programme development, focussing on chemistry and sometimes also the life sciences interface;
- the Institute of Physics (IoP) provided advice to the EPSRC commissioned survey "Employers views of postgraduate physicists" and the EPSRC provided input to their survey of career paths of postdoctoral physicists;
- the EPSRC Chief Executive and the Mathematics Programme Manager meet annually with representatives (usually the society presidents and three members of their respective councils) of the London Mathematical Society (LMS), Institute of Mathematics and its Applications (IMA), Royal Statistical Society (RSS) and the Operational Research Society. EPSRC is invited by the LMS to attend and observe meetings of the LMS Research Committee. The Mathematics Programme Manager and staff meet annually with the executive secretaries of the LMS, IMA & RSS;
- EPSRC has an ongoing dialogue with the Institute of Materials, and is represented on the Materials Strategy Committee, Industry and Technology board and other technology committees and science boards.

4.2 *Stimulating Research Networks*

EPSRC and the learned societies jointly sponsor or contribute towards a range of conferences, seminars and other activities that are specifically designed to encourage research networks and promote knowledge transfer in areas of mutual interest, for example:

- stimulating collaborative activity at the physics/biology interface through a web based bulletin board hosted by the Institute of Physics;
- the Institution of Civil Engineers has a contract to organise showcase events to encourage transfer of knowledge from researchers to practitioners;
- EPSRC is a member of several web based discussion networks run by the Institution of Electrical Engineers;
- the Institute of Physics runs a number of scientific meetings, conferences and policy fora that the EPSRC has jointly sponsored.
- EPSRC cosponsors the biennial Materials Congress with the Institute of Materials;
- EPSRC is currently working with the Institution of Chemical Engineers to develop a Young Chemical Engineers network.

4.3 *International Reviews*

EPSRC is undertaking a major rolling programme of International Reviews to provide international benchmarking of the research activity in the UK in particular disciplines. These reviews are being undertaken in collaboration with the relevant learned societies, and EPSRC funds these at a typical cost of £100,000

- The International Review of Physics was jointly commissioned by EPSRC, PPARC, OST, the Institute of Physics and the Royal Astronomical Society. The Institute of Physics provided the secretarial support for the review and the review was funded by EPSRC and PPARC.
- The International Review of Computer Science was jointly commissioned by EPSRC with the Institution of Electrical Engineers, who administered the review. The British Computer Society and the Royal Society were non-funding sponsors of the review.
- The Royal Society of Chemistry is leading on the organisation of the International Review of Chemistry, which also involves the Chemical Industries Association and the Association of the British Pharmaceutical Industry.
- The Institute of Materials is providing the secretariat for the International Review of Materials, undertaken in March 2002. The Institute of Physics, the Royal Society of Chemistry and the Royal Academy of Engineering provide nominated representatives for the steering committee for the review.

4.4 *Fellowships and the provision of trained researchers*

EPSRC works jointly with a number of learned societies to provide fellowship opportunities, studentships and training for postgraduate researchers within particular topic areas of mutual interest. For example:

- EPSRC is working with the Royal Society of Chemistry to fund chairs, fellowships and studentships in Analytical Science. EPSRC and the RSC each fund seven studentships per year. Three new chairs were jointly funded last year, and appointments are currently being made at the Universities of York and Sheffield, and at UMIST. EPSRC is also working with the RSC to award an Advanced Fellowship, with EPSRC prospectively funding a start-up grant for the successful applicant (subject to them being eligible for EPSRC funding).
- EPSRC has awarded contracts of £150k to the London Mathematical Society and £120k to the Royal Statistical Society to facilitate the provision and organisation of national/regional instructional taught courses in mathematical and statistical topics as a means of increasing the breadth of training of PhD students.

4.5 *Public awareness of science, engineering and technology*

EPSRC works in collaboration with the learned societies to promote public awareness of science, engineering and technology and in particular to enthuse schoolchildren about science and engineering research and to encourage them into research careers.

- EPSRC sponsors the Institute of Physics annual secondary schools lecture series at £10k a series. In 2001–02 these related to Optics and in 2002–03 they will cover the physics of music.
- EPSRC sponsored the Institution of Chemical Engineers to organise a virtual internet conference on environmental technology.

In 2002–03 EPSRC is providing £100k sponsorship for the "Faraday Lectures" for schools and the general public across the UK, organised by the Institution of Electrical Engineers and reaching some 40,000 schoolchildren "face to face". A yet larger audience will be reached via satellite and a follow up television programme.

April 2002

Annex

Payments to Learned Societies and Professional Institutions

		Expenditure (£k)	
	1999–2000	*2000–01*	*2001–02*
The Royal Society			
Contribution to Industrial Fellowships Scheme	200	200	200
Communication Skills Training Courses	5	5	7
Total	**205**	**205**	**207**
The Royal Academy of Engineering			
Clean Technology Fellowships	10	5	1
Contribution to International Review of Engineering	21		
Conference Sponsorship	2	2	2
Research Study: Information Needs of SMEs	13		
Total	**46**	**7**	**3**
Other Learned Societies and Professional Institutions			
Institute of Materials			
International Review of Materials			120
Student Conference Bursaries		3	
Conference Sponsorship	26		25
IoM Young Members Events	2	2	3
Total	**28**	**5**	**148**
Institute of Physics			
Summer Schools	31	33	35
International Review of Physics		38	
Conference Sponsorship	15	3	4
Public Awareness of Science activities	10	10	10
Total	**46**	**84**	**39**
London Mathematical Society			
Contribution to Short Courses	7	39	18
Total	**7**	**39**	**18**
Royal Society of Chemistry			
Conference Sponsorship	2	5	7
Total	**2**	**5**	**7**
Institution of Chemical Engineers			
Public Awareness of Science Activities	12		
Total	**12**	**0**	**0**
Institution of Civil Engineers			
Contribution to Conferences			2
Total	**0**	**0**	**2**
Institution of Electrical Engineers	0		
International Review of Computer Science	0		117
Contribution to Conferences and Training Schools	0	8	
Total	**0**	**8**	**117**
Institution of Mechanical Engineers			
Sponsorship of Conferences and export meetings	1	16	4
Total	**1**	**16**	**4**

NOTE: figures exclude payments for meeting room hire etc by EPSRC on a commercial basis

APPENDIX 12

Supplementary memorandum submitted by the Engineering and Physical Sciences Research Council

EPSRC works collaboratively with the Royal Society and the Royal Academy of Engineering on several fronts and is supportive of the work of these organisations. The nature and extent of interactions were outlined in the earlier written evidence from EPSRC to this inquiry. With respect to Fellowships the interactions provide EPSRC with unique and high profile opportunities to attract and support world-class researchers, which in turn enables EPSRC to deliver against its remit.

In addition to joint sponsorship of fellowships with these learned societies EPSRC currently support three different Fellowship Schemes: Senior Research Fellowships, Advanced Research Fellowships and Postdoctoral Fellowships in Mathematics and Theoretical Physics.

A. Analysis of the Cost Efficiency of EPSRC Fellowship Schemes

The table below shows the total and unit direct costs of administration for fellowships schemes as a whole in the financial year 2001–02. Our selection system is based on application, peer review, interview and post award monitoring. The total and unit costs for administration are dependent on the number of proposals received.

	Total Cost (£)	*Unit Cost (£)*
Pre-award	111,000	434
Post-award	18,000	90
Monitoring/evaluation	7,000	167

B. Characteristics of EPSRC Fellowships Schemes

Senior Research Fellowships

Senior Research Fellowships are awarded to outstanding academic scientists and engineers of international repute, to enable them to devote themselves full time to personal research. Up to three of these most prestigious EPSRC awards are made each year. The proposed research must be important and timely and should offer opportunities for major scientific advances. Fellows are encouraged to contribute to the public awareness of science, engineering and technology. Fellowships are full time for up to five years and are tenable in the UK.

There are three components to these awards: salary, fellowship support fund and an optional research grant.

EPSRC will pay Senior Research Fellows current salary but the university is responsible for national insurance, superannuation and any salary increments. Indirect costs are not payable.

The Fellowship Support Fund is £4,000 per annum and is for use at the discretion of the Fellow. It can be used to provide small items of equipment, consumables and travel and subsistence.

If resources over and above the Fellowship Support Fund are required, Senior Research Fellows can apply for a research grant. The application should be submitted with the Fellowship application.

Advanced Research Fellowships

Advanced Research Fellowships are awarded to outstanding young researchers, normally less than 35 years of age, with a minimum of three years postdoctoral experience. Fellows are expected to devote themselves to full-time research for the period of the award (up to five years), with the expectation that they will have established an independent research career of international standing by the end of the award.

There are three components to these awards: salary, fellowship support fund and an optional research grant.

EPSRC will pay Advanced Research Fellows an "age-for-wage" salary based on the UCEA lecturer A/B scale. Spine point 18 is the maximum that EPSRC will pay. Salary costs include national insurance and superannuation contributions. Indirect costs are not payable.

The Fellowship Support Fund is £4,000 per annum and is for use at the discretion of the Fellow. It can be used to provide small items of equipment, consumables and travel and subsistence.

If resources over and above the Fellowship Support Fund are required, Advanced Research Fellows can apply for a research grant. The application should be submitted with the Fellowship application.

Postdoctoral Fellowships in Mathematics and Theoretical Physics

Postdoctoral Fellowships are available for mathematicians, statisticians, operational researchers and theoretical physicists. The aim of the scheme is to help outstanding young researchers establish an independent research career immediately or shortly after completing their PhD. Up to 10 awards are available across Mathematics, Statistics and Operational Research and up to four awards are made available in Theoretical Physics each year. Fellowships are full time for up to two years in Mathematics, Statistics and Operational Research and up to three years in Theoretical Physics.

There are two components to these awards: salary and a fellowship support fund.

EPSRC will pay Postdoctoral Research Fellows an "age-for-wage" salary based on the UCEA lecturer A/B scale. Spine point 18 is the maximum that EPSRC will pay. Salary costs include national insurance and superannuation contributions. Indirect costs are not payable.

The Fellowship Support Fund is £8,000 per annum and is for use at the discretion of the Fellow. It can be used to provide small items of equipment, consumables and travel and subsistence. Postdoctoral Fellows are encouraged to use part of their Support Fund to spend time at other academic institutions or industry, in the UK or overseas, to develop research collaborations.

Postdoctoral Fellows are not eligible to apply for a research grant.

Career Breaks and Development

Research Fellows have the option to put their Fellowship into abeyance for up to two years within the five year Fellowship. This enables the Fellows to take a break from their research to help develop their career. EPSRC also actively encourage candidates who have had career breaks to apply for Advanced Research Fellowships.

EPSRC also host an annual workshop for all Advanced and Post-Doctoral Fellows. These events give the Fellows the chance to input their creative ideas into discussions with the Programme Managers that will influence EPSRC funding strategies. The events also give EPSRC a chance to advise on career development. EPSRC requests a statement on the Advanced Fellows application form to specify how they are going to support and manage the Fellows career development.

All fellows are eligible for standard maternity and sickness leave.

C. APPLICATIONS FOR INTERDISCIPLINARY RESEARCH

EPSRC Fellowship schemes deal with interdisciplinary proposals in the following way. All proposals are sent out for peer review to referees who are expert in the particular research area of the Fellowship. If a proposal is multi- or interdisciplinary then referees are selected so as they cover all aspects of the research.

The Panels that assess the proposals are held across subject areas (ie Chemistry, Physics, Maths, Engineering, Technology) resulting in broad panels that can manage assessing interdisciplinary proposals. A central panel, (across the whole of EPSRC's remit) chaired by the Chief Executive, then takes the final decisions on both Advanced and Senior Research Fellowships.

May 2001

APPENDIX 13

Memorandum submitted by the Environment Agency

The Environment Agency welcomes the opportunity of providing written evidence to the Science and Technology inquiry into Government Funding of the Scientific Learned Societies.

We would like to emphasise the importance of the independent role of these societies, particularly when scientific advice and opinion is required by Parliament and Government. Their independence and international standing is key when expert inquiries are held, as illustrated recently by the Royal Society inquiry on Infectious Diseases in Livestock. Funding should be both sufficient and secure to ensure the structures remain truly independent; with robust funding they can continue to act as an independent source of scientific scrutiny of Government.

It would be inappropriate for the Royal Society to focus unduly on applied science. We need a balance of scientific inquiry, and blue skies research is equally important as applied. An example has been work on extreme value theory, as presented at a recent Royal Society meeting, which is "pure" science, but also very relevant to managing flood risk. However, it should be recognised that the science elite represented in the Royal Society are not always as well integrated as they might be into the industrial cutting edge at which science is being applied in practice.

We recognise the value of the Royal Society Fellowships as an alternative source of funding for our brightest young scientists, and would wish to see a good proportion of these allocated in research areas relevant to environmental protection.

Historically, the ability of the Royal Society and the Royal Academy of Engineering to communicate with the public has been limited. It is recognised that the Royal Society has developed a communicating science programme, which although early in its development, appears well thought out and a good way to progress. The role of the societies in communicating to the public in relation to that of other bodies needs to be carefully considered.

March 2002

APPENDIX 14

Memorandum submitted by the Economic and Social Research Council (ESRC)

ESRC POSTDOCTORAL FELLOWSHIPS: PROCESSING APPLICATIONS

The following information was requested. "Please provide an analysis of the cost efficiency of Postdoctoral Fellowships programmes, indicating whether your accounts isolate administrative costs associated with these schemes."

Average ESRC staff salaries 2001:

Band 3	£24,000
Band 4	£17,000
Band 5	£13,200

Using the time recording data we have established that the approximate time spent administering the scheme in 2001 was as follows:

	Time spent	*% of salary*
Band 3	29%	6,960
Band 4	14%	2,380
Band 5	24% (12% x 2)	3,168
Total		12,508

Using the average staff salaries for 2001 the total annual staff costs to Postgraduate Training Division for administering the scheme was £12,508. However, this was the first year of the scheme and much of the band 3 time was spent in writing the documentation and developing the scheme. We have also streamlined the referee selection process this year so in practice these costs should be lower this year and subsequently.

The amount of money paid out to a pool of referees during the period 1 April 2002 is £9355.00 or approximately £252.00 per referee.

An independent Panel was set up to make the final funding decisions. The amount paid out to Panel members who attended the meeting during April 2002 is £2755.56.

Total costs are therefore in the region of £25k. We received 250 applications so could say that the average cost of processing an application is about £100. This does not take into account post-award admin costs in PTD which were not recorded separately.

ISSUING AWARDS

The figures quoted have been provided by our colleagues within the ESRC finance division. The total cost of administering postdoctoral fellowship awards during the full first year, including balancing claims and final claims, is £1356.48

(b) The main features of the Postdoctoral Fellowship Scheme are:

- each award is for one year only;
- the scheme is restricted to those who have just completed their doctorate, or expect to be awarded their doctorate in the coming year;
- applicants are expected to provide a mentor to support the fellow but in addition the institution is required to demonstrate its commitment to the long term support and promotion of new researchers within its research strategy;
- the mentor will be a senior colleague within the institution and will provide guidance and support for the fellow during their award.

(c) How does the scheme deal with applications for interdisciplinary research?

As long as the applications are within the social science remit, we deal with them in the same way as other applications to the scheme, ensuring appropriate academic review.

ESRC Research Fellowships: Processing Applications

In answer to your questions, the ESRC has a Fellowship Scheme, which provides for full salary support for academic social science researchers at two stages of their careers—Senior Fellowships for those with an outstanding track record and Junior Fellowships, for post doctoral researchers who have already demonstrated exceptional promise. The awards can be made for up to three years.

Specifically:

(a) We do not analyse costs of these schemes separately from the costs of processing all our research awards

(b) This scheme gives both senior and less experienced researchers the opportunity to undertake a period of concentrated research activity. Fellowships provide a significant career development opportunity for promising researchers, who benefit from a term in concentrated research activity and development. For more senior researchers, the Fellowships will contribute to the achievement of sustained high quality research knowledge and expertise.

Fellowships fund a wide variety of academic activities ranging from further training to the consolidation of previous research. Fellowships offer a salaried period of two to three years (five years in exceptional circumstances) to researchers working in all areas of social and economic science.

Fellowships may be used to consolidate previous research, to assist theoretical and methodological development through journal articles and to provide time to write books. Some of the time may be used to develop skills, such as undertaking training in advanced research methods, research management and teaching.

A minimum of extra responsibilities will be expected of the Fellow to contribute to the development of the research field and appropriate dissemination to non-academic audiences, such as teaching, supervision, dissemination or networking seminars.

Each award is made for a known person based on their research potential or their track record of excellence in research.

A Fellow with less than 10 years' post-doctoral research experience will have a mentor within the institution who will support and appraise the Fellow's progress annually and submit a report to the ESRC.

(c) All our responsive Awards, including Fellowships, are made by a single multidisciplinary Board, the Research Grants Board, which covers the whole of the social sciences. Interdisciplinary applications, and applications from one or more disciplines, are peer reviewed and evaluated on their merits.

June 2002

APPENDIX 15

Memorandum submitted by the Geological Society of London

The Geological Society of London is the UK's national learned and professional society for the Earth sciences, able to confer Chartered status on appropriately qualified Fellows. It is a registered charity (210161), was founded in 1807 and incorporated under Royal Charter in 1825.

> "for the purposes of investigating the mineral structure of the Earth".

The Society achieves this object through its wide-ranging work—including:

- facilitating knowledge transfer by:
  - maintaining one of the most extensive geological libraries in the world with open public access;
  - arranging over 100 scientific meetings each year held in different parts of the country through its 23 specialist and 13 regional groups; and
  - publishing geological books (averaging 24 a year) and four journals, as well as three others on behalf of other learned societies;
- promoting professionalism by:
  - awarding the designation of Chartered Geologist to appropriately professionally qualified Fellows (currently about 2,000 of the Society's Fellows have attained this aspirational grade);
  - providing continuing professional development for geologists some of which will shortly be Web-based;
- supporting education standards by:
  - accrediting university undergraduate Earth science courses;
  - promoting geological education through schools liaison activities, most recently via SETNET;

- public outreach, and parliamentary liaison by provision of the secretariat for the All-Party Group on the Earth sciences and maintaining a website that, in addition to news items, is a forum on Earth science related matters of current public or specialist interest;
- providing responses to Government and other inquiries on all matters relating to the teaching, research and the practice and application of the Earth sciences;
- providing accommodation for the leading amateur geological society in the country, the Geologists Association;
- discharging various international representational duties delegated to the Society by the Royal Society.

Much of this work is described in the leaflet, *Stimulating zeal.*

The Society is the oldest national geological society in the world, and the largest in Europe, with a Fellowship of over 9,000 worldwide that is still growing. The Society works closely with kindred Earth science societies in the UK and overseas and has a number of bilateral agreements covering publishing and the joint organisation of scientific meetings. Fellowship is open to all who have demonstrated a commitment to the Earth sciences, whether professional or amateur. The Society draws its Fellows from all regions of the UK, their regional spread broadly mirroring overall population density. Nearly 20 per cent of our Fellows live outside the UK.

The average age of the Fellows is 42. Of the Society's four honorary Secretaries, two are women (External Relations, Professional Matters) and two are men (Science, Publications). Among the younger fellows roughly half are women but in the older age groups men predominate.

Fellows pay an annual subscription that is generally graduated according to age with the maximum being reached in later middle age and then declining again. The Society receives no direct funding from Government. Its premises (in Burlington House) were, however, built in 1874 from funds granted by Parliament to create a permanent home for the Society's sole and rent-free occupation in perpetuity. It is a matter of great concern that this is now under threat from the Department for Transport, Local Government and the Regions.

The DTLR is seeking to put itself in a legal position to be able to charge the Society rent which is causing the Society serious concern (as it is to our neighbouring courtyard societies who are under similar threat). Not least of these concerns are the mounting legal fees that we are incurring to contest this claim. These have to be diverted from scientific purposes within what is already a tight budget to which the largest source of income is the subscriptions from Fellows. If the Society is forced to pay an economic rent it would have to move from Burlington House. One major regrettable consequence would be that a heavily used public facility, namely the Library, would almost certainly have to be re-located at a place that was much less accessible to all.

The Society would be most grateful for any support that the Committee felt able to offer.

April 2002

APPENDIX 16

Memorandum submitted by Professor Charles M Goldie, University of Sussex

My contention is that the Royal Society, which has long had few Fellows from the mathematical sciences, has in recent years drifted into almost total neglect of the area within it that I know and belong to, statistics and probability. That is, the self-replicating nature of the Fellowship has been allowed to drift into a state where the natural tendency of Fellows to favour their own fields has led to a serious distortion and imbalance.

This may be an instability that has led to other fields being similarly neglected or, conversely, over-represented; I wouldn't know. But I hope that lack of similar complaints from other branches of mathematics, or science generally, will not cause you to discount this letter. You are hardly likely to hear from over-represented areas. From within any similarly under-represented scientific fields there are very great obstacles against the making of such a complaint. Those who have the standing to do so are likely either to have been elected Fellows themselves, and thereby naturally tend to feel that all must be well, or to be in contention for Fellowship, when their views would tend to be discounted by their being considered interested parties, and in any case they would certainly not express them for fear of damaging their chances. My own position is that I am not a contender for Fellowship, but I have researched and taught in my own field since graduating from Imperial College in 1964, and occupy a central and senior enough position to be able to speak with confidence. Furthermore, towards the end of this letter I shall list evidence that supports my claim.

Insofar as the Royal Society is now partial and discriminatory in its coverage of science it is clearly not fit to be a conduit for public funds of the sort it has become. However, I want to add straight away that I fully accept that only the Royal Society can address and act on any problems concerning its own membership. No other body can or should tell it what to do. My hope is that your enquiry will lead to it recognising that it has a problem concerning the subject balance of its membership, and that the Fellows will be moved to correct it.

I write to you as Chair of HoDoMS (Heads of Departments of Mathematical Sciences in the UK) because the dearth of Royal Society Fellows has significant adverse consequences for my member university departments. Those departments cover pure and applied mathematics, statistics and operational research, and we extend throughout the UK including Scotland, Wales and Northern Ireland. Although there has not been time for me to consult my members I am confident they will back me up in my contention of a general lack of Royal Society Fellows in our field, and of specific neglect of my own area once they see the evidence. The main adverse consequence is a major contribution to the general invisibility and lack of "clout" that afflicts mathematical departments for a number of reasons, and a resulting failure to win resources. When Vice-Chancellors have major decisions to make concerning science they look for outside advice, and whom do they seek it of? FRSs, naturally, as those are the individuals who have the badge of authority that they can rely on. There are currently numbers of smaller mathematics/statistics departments in danger from the disaster that affected AS Level Maths last summer—see Lucy Hodges's article "What does a decline in maths really add up to?" in the *Independent* of 7 March—and Vice-Chancellors feel free to lay about them against a field that to them seems to have few world-class figures to raise opposition.

The evidence that I promised consists of a complete list of the FRSs in my own area, statistics and probability, considered in relation to the size and strength of that area. Here is the list, of those still living, by date of election. It involves my own judgement of whom to include, but I had no difficulties of demarcation and am confident that any senior colleague would back up my choices of inclusion and exclusion in virtually every case.

1955	D J Finney
1964	D G Kendall
1966	Sir Richard Doll
1967	C. R Rao*
1971	Sr John Kingman
1973	Sir David Cox
1974	Sir Walter Bodmer
1976	J M Hammersley
1978	P Whittle
1981	J A Nelder
1984	D Williams
1985	G E P Box**
1989	F P Kelly, Sir Richard Peto
1994	D J Aldous**, P. McCullagh**
1997	B W Silverman
1998	S R S Varadhan*
2000	W Ewens*, P G Hall*
2001	A F M Smith

* Commonwealth citizen, employed abroad

** British citizen, settled in USA

You will see from the table that there have been only two individuals in this country elected in the 12 years 1990–01 inclusive. What is the size of the field in this country? Those towards the statistical end are likely to belong to the Royal Statistical Society while those more in probability (there is a continuum of interests in between) will usually join the London Mathematical Society (a national society despite its name), and many, like me, are in both. The RSS has 7,200 members, perhaps two-thirds in this country, and virtually all of those are in the subject area that I have used to construct the above table. The LMS has 1,500 members in the UK, of whom only a hundred or two work in probability/statistics and are not also in the RSS. At a very rough guess one arrives at about 5,000 individuals in my field in the UK. The table shows that this population gives rise to 14 FRSs in this country. That is surely a low proportion, but the really telling figures come from extrapolating the recent rate of election from the field. Assuming continuance of the two-every-twelve-years rate of election, and assuming, generously, that newly elected Fellows live for 36 years after election, one arrives at a steady-state total of six FRSs in this country from probability and statistics, a field of perhaps 5,000 scientists. This is catastrophically few. The Institute of Physics has 30,000 members, perhaps 20,000 in this country. It is inconceivable that physics could have only 24 FRSs in the UK. The Royal Society, which has 1,216 Fellows, would be an order of magnitude smaller.

All those listed in the above table are male, by the way. The problem of its Fellowship being overwhelmingly male is one that the Royal Society recognises, but the field of statistics and probability shows up as a signal instance of the imbalance: to my knowledge it has not ever had a female FRS.

Could the Royal Society's neglect of my field be explained by the field being moribund, no longer producing good new science? No: there is simply no way that any such claim could be maintained. In last year's Research Assessment Exercise the panel for Unit of Assessment 24 (Statistics and Operational Research), under which most researchers would fall, awarded the highest average grade of the three mathematical panels. A small proportion of the relevant individuals will have been assessed under Pure Mathematics (Unit of Assessment 22), but the average grade under that panel was again high. All panels used overseas experts. Overall improvement in research in the mathematical sciences has led the relevant research council, the EPSRC, radically to expand the funding allocated to its Mathematics Programme, within which my area wins its proportionate share in the general competition.

Another indication of health and vigour is that both learned societies, the Royal Statistical Society and the London Mathematical Society, have recently expanded into new, impressive, central premises, and the energy, confidence and breadth of their activities is plain for all to see.

I have made my case but I ought to reconcile what might seem my contradictory statements that certain maths/statistics departments are under threat, and yet research in the area is extremely healthy. There is no contradiction, because it is the smallest and most marginal departments that tend to face difficulties, and they do not have a substantial research presence. Concentration may be in progress, but that is a whole other topic. Concerning it, let me just remark that when Stephen Timms, Minister of State in the DfES, came at my invitation to address the HoDoMS Annual Conference last week, he told us that the country needs 40 per cent of maths/statistics graduating cohorts for the next few years to enter school-teaching. This ambitious target cannot be delivered by the grander research-intensive departments alone. It needs universities and HE Colleges with local catchment areas to continue to contribute, up and down the country. Concentration will render the delivery of an adequate supply of trained manpower impossible.

April 2002

APPENDIX 17

Memorandum submitted by the Institute of Association Management (IAM)

1. INTRODUCTION

(a) The Institute of Association Management (IAM) is the leading independent professional body comprising chief executives and other senior personnel responsible for the management, development and governance of professional institutions, learned societies and other representative bodies. IAM's membership includes senior managers of organisations which are the subject of this inquiry. Many of these organisations play a significant role in the advancement of science and technology and therefore the economy of this country. Some are also affiliated to the Engineering Council UK and the Science Council.

(b) This Institute was founded in 1933. It is an unincorporated association and is funded through membership subscriptions and income from conferences, donations and training initiatives etc. IAM does not receive any form of government funding and is entirely self-financing.

This Institute welcomes the Science and Technology Committee's inquiry into the funding of scientific learned societies. We hope that it will lead to a more transparent, rational and equitable approach to future funding as this has been a matter of concern to the Institute and its members for some time. We are pleased to offer this text as IAM's contribution to the Committee's inquiry and we would be pleased to give oral evidence if invited to do so.

2. EXECUTIVE SUMMARY

(a) IAM urges government to continue funding independent learned societies. They perform an important role in society, regulate the professions they serve and are an authoritative source of objective advice to governments and the public. However, we also urge the government to spread available funds more equitably and to refrain from the "patronage" of a few.

(b) IAM urges government to review the funding criteria for learned societies and to create a new funding framework. Such framework to take account of:

(i) the extent to which a body is financially sustainable and self-supporting;

(ii) a body's policies in relation to inclusivity, equal opportunities, sustainable development and ethical behaviour.

(c) IAM takes the view that funding criteria should, generally, be based on principles of "additionality" with government funds supporting new work and not necessarily the core activities of a learned society.

(d) IAM believes that funding should be conditional and justified by a Strategic Plan. The Plan should include targets, performance indicators and a methodology that will enable government to assess performance against the Plan and the achievement of value for money.

(e) IAM urges government to consider a much broader range of learned societies for allocation of funds using a set of criteria which is fair, open and transparent embracing value for money tests.

(f) IAM urges the government to support and incentivise closer collaboration between learned societies that share a common role and remit.

3. ISSUES

(a) IAM's evidence on the funding of learned societies is based on the following key issues:

(i) confirmation of the role of learned societies.

(ii) the need for a framework for funding;

(iii) the case for widening access to government funds.

(b) For the purposes of this evidence this Institute's definition of "learned society" includes any independent learned society or professional body that applies knowledge and expertise necessary for the good and beneficial governance of membership organisations. We specifically exclude those bodies which hold political or commercial affiliations.

4. CONFIRMATION OF THE ROLE OF LEARNED SOCIETIES

(a) Learned societies and professional bodies perform a unique role. The majority are independent of political and commercial interests and rely on the voluntary efforts of their members. They care about their profession and are committed to the common good. Therefore, these learned bodies play a critical role in providing independent expert advice to government, the public, fellow professionals and others; regulation of the profession and professionals they serve; education and training; professional development; research and much more besides. They provide a platform for objective debate on the critical scientific and technological issues of the day and the very best are forward-thinking, providing innovative solutions to pressing social needs. IAM suggests that if learned societies did not exist they would have to be created or, government itself would have to perform many of the functions they now provide.

(b) IAM is aware that successive governments have expressed a view that there are too many bodies serving similar professional interests leading to conflicting advice and duplication of effort. The need for closer collaboration of learned societies to create a single authoritative voice has, to some extent, been heeded and there is now a Science Council which acts as an over-arching body for science-based learned societies and professional bodies. Its creation is a welcome development.

(c) Although the IAM is not a federation of like-minded bodies it does bring together the chief executives of NGOs, societies, associations and institutions. Collectively, therefore, we represent senior personnel of bodies from all aspects of science, technology and industry. We hope that the government will recognise the value of our role and allow the Institute to contribute to the delivery of its social and other priorities as a result of this inquiry.

(d) Initiatives that lead to collaboration between learned societies, and those who manage their affairs, are to be applauded. They deserve government support since it is government that will be a key beneficiary. The process by which government is informed and advised, under such arrangements, will rationalise the consultation and advisory process. This Institute urges the government to consider incentivising any cluster of learned societies, that share common aims and objectives, in order to encourage them to co-ordinate their activities.

THE NEED FOR A FRAMEWORK FOR FUNDING

(a) IAM believes that government should continue to fund learned societies—many of them continue to make a tremendous contribution to the health, wealth, culture and standing of this country. They also make a significant contribution to the advancement and application of science and engineering for the public benefit. Much of this excellent work is undertaken by members of learned societies on a voluntary basis and IAM believes that so much more could be achieved if some of the available (or any additional) funding was directed to those bodies who currently do not benefit from government support. That only a select few learned societies receive government support represents an opportunity lost. IAM believes that there is an urgent need to review the current funding structure and to establish a new framework for funding based on merit, value for money and sound management principles. For example, funded bodies should demonstrate that they are inclusive and have policies in relation to equal opportunities. They should also show that they are committed to sustainability and operate within an acceptable code of ethics. Such bodies should be open, inclusive and committed to delivering outputs which serve their profession, inform the public and contribute to social priorities.

(b) Government funding should be conditional and relate to a prescribed programme of activities, targets and performance indicators which show how a funded body is contributing to innovation, excellence and a better public understanding of science and engineering. We also advocate that a learned society be required to submit to government a Strategic Plan justifying initial and continued funding. Such bodies should report, annually to government, on actual performance against the Plan.

(c) IAM understands that, in any new framework for the funding of learned societies, government may not wish to underwrite core activities and overheads. This Institute certainly believes that such bodies should be self-financing and that government funding should be provided on the "additionality" principle. That is, funding should support projects and initiatives that a learned society could not otherwise fund from its own resources but for which there is a demonstrable need. Government funding of these "value added" projects should, by definition, lead to innovation and better practice, have measurable outputs, be demand led, meet social priorities and offer better value for money than the current funding arrangements.

6. Widening Access to Government Funds

(a) Currently, only a small proportion of learned societies receive government funding. This seems to be based largely on historical practice and discounts the potential of many other learned societies to contribute to social and government priorities. Many of the bodies that do not receive government funding could easily make a case for doing so. The fact that there is no obvious mechanism for accessing available funds is unfair. It discriminates against those learned societies with an excellent track record of achievement in favour of an elite few who are effectively "subsidised" by the taxpayer and who do not necessarily represent the views or activities of other bodies.

(b) The current funding regime, under which the Royal Society, the Royal Academy of Engineering and certain other bodies receive significant amounts of government funds, is not only discriminatory but gives the impression that other learned societies are not worthy of support or recognition. This "smacks" of exclusivity and should be changed. It perpetuates a tradition which is no longer relevant in a modern, more accountable world where greater transparency is, or should be, the norm. The government funding and "patronage" that certain bodies now enjoy may have been appropriate one and two hundred years, or more, ago but a modern world with a different ethos and culture demands that the reasons for continuing with that approach are vigorously tested. Other learned bodies must be allowed to make their case. This is the basis of good public governance and should be regarded as part of the modernisation of government.

7. Conclusion

(a) IAM welcomes this inquiry. We urge the government to continue to fund learned societies but within the context of a new funding regime and framework. This Institute advocates a system which is modern, inclusive, transparent, encourages outputs that meet social priorities and recognises the potential contribution of all learned societies to the improved health, culture and economy of this country.

(b) In supporting a fairer and more transparent funding system for learned societies we advocate that such funds should not, without good reason, be used to underwrite a body's core activities or overhead costs. We firmly believe in the principle of "additionality" with funds being used for specific initiatives that are relevant to social and government objectives and that a body would not otherwise be able to undertake. All bids for government funding should be supported by a Strategic Plan showing measurable outputs.

(c) Finally, IAM urges government to encourage those learned societies, that share common aims and objectives, to work co-operatively in clusters or partnerships. It is in government's interest that learned societies come together and speak authoritatively with one voice and reduce the incidences of repetition and duplication of effort. The funding mechanism could be used to offer incentives for so doing.

May 2002

APPENDIX 18

Memorandum submitted by the Institute of Biology

Summary of Recommendations

Grants should be allocated across all professional bodies providing technical information to Government on a rolling three-year term to ensure that support staff are put in place to provide the relevant information effectively.

Government should provide support on a regular basis to fully fund conferences on important scientific issues, subcontracting the organisation of the conference to the principal professional body.

Government should ensure that the quality of work undertaken in the bioscience area is of the highest quality. It should do that by:

(1) ensuring that all senior government bioscience posts are held by qualified persons who would be expected to have chartered status

(2) ensuring that it is "best practice" in government bioscience posts that staff follow a "Continuing Professional Development" (CPD) programme

(3) industry should be encouraged to employ qualified chartered bioscientists in key positions. This commitment should be strengthened by ensuring that subcontracts externally tendered also involve chartered bioscientists in responsible positions.

(4) promoting to universities, higher education establishments, and schools the need for professionally qualified employees who undertake CPD programmes of the like already established by the

Chartered Institutes. It should discourage splinter CPD programmes that tend to confuse the already fragmented bioscience profession.

Government should emphasise the need for a unified bioscience profession and support that by providing funds to achieve the unification.

In all professions, promote a quality "kitemark" of "Chartered Status" to the public. This in turn would help to encourage people to join Chartered Bodies and so promote the regulation of a standard of work across a wide spectrum of the UK with little cost to the Exchequer.

Government should pay for the costs of Institutions belonging to world wide bodies such as IUBS (International Union of Biological Sciences) and ECBA (European Countries Biologists Association) so that the UK has greater influence on the worldwide stage

A scheme to support information to and from the EU should be established with Government resources.

EVIDENCE

A. The Institute of Biology receives no recurrent funding from Government of any kind. We have received modest (but welcome) occasional support for workshops.

B. Although the total funding for IoB may seem modest, a huge amount of our output is provided by (unpaid) volunteers. The public, the media and Government all benefit from this to an incalculable extent.

C. We advise Government through:

(1) Responses to Select Committees:

— we have produced more than 100 Responses during the past four years. They cover topics ranging widely and covering areas such as the need for a National Park around Loch Lomond, GM Crop Separation, and Antibiotic Resistance. Hence they inform many different Government Departments (Health, MAFF, DEFRA, DfES, DTLR, Scottish Parliament, Welsh Assembly, etc).

— Our expenditure on this is in excess of £80k per annum. A modest amount of support (less than £20k) is received from our Affiliated Societies for this. The ultimate beneficiary is UK plc. The principal immediate beneficiary is the Government, its Departments and Agencies as well as Parliament.

(2) Briefing papers:

— Although we have produced fewer of these (eg Biological Weapons), a number of these have been published in Journals directed at Parliamentarians (eg Science in Parliament, Science and Public Affairs).

— We also produce Discussion Papers such as that on Long Term Environmental Research.

(3) Workshops to which Members of both Houses of Parliament are invited. Recently these have included:

— Diagnosis and Remote Sensing, The Biology of Air Pollution, BioFuels, and Anti Infectives.

(4) Affiliated Societies Fora where Government and their advisers regularly meet directly the Biological community. We have hosted Lord May, Dr Michael Clarke, Lord Sainsbury and the Chief Executives of relevant Research Councils.

D. We communicate science to the public through:

(1) Branch meetings—many of which are open to the public. Several run in collaboration with BAAS, IoP, RSC, etc

(2) Schools events, lectures, competitions, of which the BBO (British Biology Olympiad) is biggest. We sponsor speakers at events during National Science Week and at schools and universities throughout the year.

(3) Informing the public through Biology teachers. The Journal of Biological Education reaches more than 30 per cent of all relevant schools in the UK.

E. We represent UK overseas through membership of the European Countries Biologists Association (ECBA) and the International Union of Biological Scientists (IUBS). We are responsible for selecting, training and escorting the UK team to the International Biology Olympiad.

We spend nearly £20k per annum on this, but note that the Royal Society received direct Government funding to enable it to undertake such representation on behalf of the United Kingdom.

10 per cent of our membership live overseas and cover a total of 96 different countries. In many (particularly less developed) countries, IoB is the only representative biological organisation.

F. We would wish to do more:

(1) Produce proactive briefing papers eg Biological Weapons, Antibiotic Resistance, Climate Change, Vaccination, and Food Supplementation.

We suggest that Government Departments and Agencies invite organisations such as IoB to tender for such activities.

(2) More events for schools and local populations.

Once again, we would be happy to carry this out under contract and regard it as an area that is sadly deficient at present.

(3) More workshops on topical, policy driven topics such as energy sustainability, food and farming, stem cell research, the impact of climate change, conservation of biodiversity, GM crops and food in order to engage the public in discussion.

(4) More public events to stimulate informed debate on controversial issues such as embryo research, intensive farming, and complementary medicine. These would often be run in collaboration with other cognate organisations such as the BAAS, RSC, IoP, RI, with all of whom we have a close working relationship.

We are only one of the few independent voices left and also one of the few bodies endowed with a Royal Charter. We are therefore in a unique position to facilitate and implement such public involvement.

G. We are co-ordinating the biological community through our Affiliated Societies and through the development of a Federation of Life Sciences.

This enables the Government to access the Biological Community as easily as it can access Chemistry and Physics.

We have invested large amounts of our funds on this during the past four years.

We note the provision of funds to enable the Royal Academy of Engineering to carry out such work. We suggest that we should be allowed to bid for similar support to catalyse the development of such a focus for Biology.

H. We do not believe that it would be appropriate for Government to provide core funding for organisations such as IoB. It would undermine our independence and hence actually diminish our usefulness. However, Government does contract for advice and currently does this outwith the professional and learned bodies. They should become a central focus for providing such information.

April 2002

APPENDIX 19

Memorandum submitted by the Institute of Food Science and Technology (IFST)

1. The IFST is the independent professional qualifying body for food scientists and technologists. Its purposes are:

(a) to serve the public interest by furthering the application of science and technology to all aspects of the supply of safe, wholesome, nutritious and attractive food, nationally and internationally;

(b) to advance the standing of food science and technology, both as a subject and as a profession;

(c) to assist members in their career and personal development within the profession; and

(d) to uphold professional standards of competence and integrity.

2. The inquiry is focussed on the role of the Royal Society and the Royal Academy of Engineering. We wish to comment on the role of the Royal Society and that of professional bodies such as IFST.

3. The Royal Society is a body whose members are outstanding academic scientists. There is no doubt about the prestige and intellectual quality of the Society and its members. However, the Society is not representative of British science and technology as a whole as it fails to represent the very broad spectrum of science and technology within the UK, and which is of vital importance to the maintenance of the economic competitiveness of the country and the well being of its citizens.

4. The Royal Society quite properly recognises the importance of groundbreaking, innovative research. However this tends to lead to a definition of science quality which recognises the novel but does not recognise that major innovations in academic science require a huge effort of applied research and development in order to turn them into practical innovations leading to wealth creation and improvements in the quality of life. As a result of this, applied science and technology such as food science is not *per se* represented in the Society despite its importance to the country's economy and well being.

5. Professional and learned bodies such as the IFST represent a much broader range of science and technology than does the Royal Society and are therefore much more in touch with the mainstream of science and technology in the country.

6. Because of the range of expertise and experience encompassed by Institutes such as IFST they are in a very strong position to assemble expert panels in order give objective specialist advice to the Government. The quality and activity of the IFST in providing independent information is evidenced by its long record of objective scientific responses to consultations by government departments and agencies, and by its Information Statements on a number of issues of public concern.

7. The funding currently directed to the Royal Society could be more widely dispersed to other learned and professional and scientific societies in order to ensure a wider spread of advice to government and public.

April 2002

APPENDIX 20

Memorandum submitted by the Institute of Physics

The Institute of Physics, the professional body and learned society representing physics and physicists, with over 37,000 members, is pleased to have the opportunity to respond to the House of Commons Science and Technology Committee's Inquiry into Government Funding of Scientific Learned Societies.

The Institute receives no Government funding for its core activities and does not wish to do so. The Director General of the Research Councils' Memorandum to the Science and Technology Committee, dated 7 February states that "the EPSRC makes small sums available annually to the Institute of Physics (c£65,000.00). . . ". This primarily relates to funds provided for an annual summer school in Condensed Matter Physics for which the EPSRC provides travel and subsistence funds for participants, and the Institute acts as a transient holder of funds. All monies received are distributed with none retained for administration costs. This is a legitimate role for learned societies, and ensures that Research Council funds are efficiently and effectively disbursed in line with the objectives of the Council.

Learned societies value their independence. They are funded primarily by members, and conference and publishing income. Where publishing is successful, as is the case with the Institute of Physics, funds are generated which are used to promote physics and support physicists. It is without fear or favour that societies like the Institute of Physics can either commend or criticise Government.

The Government and its agencies have, in the past, not made as much use of the experience and expertise which lies within learned societies, as they could or should. The Institute receives for comment most of the relevant (to physics) documents issued by Government Departments, Select Committees or Research Councils, and endeavours to consult the membership and respond within the, occasionally short, timescale.

But the learned societies have more to offer Government, as demonstrated by the Office of Science and Technology's approach, in 2000, to the Institute as well as the Royal Astronomical Society, to conduct a review of the standing of UK Physics Research.* The Engineering and Physical Sciences Research Council and the Particle Physics and Astronomy Research Council were co-sponsors and provided the majority of the funds for the Review. This is a pertinent example of how the wealth of knowledge and expertise residing within the Institute of Physics can be used to benefit the nation. The Institute would welcome further invitations to become involved in projects or Inquiries at the behest of Government and its agencies.

The Institute, in common with other learned societies, including the Royal Society and the Royal Academy of Engineering, is concerned to ensure that science is well taught in schools and is communicated effectively to the public. The Institute has a comprehensive, on-going, programme aimed at schools and the public in general. Our Schools Lecturer undertakes a punishing programme of visits to schools throughout the United Kingdom. Each year the lecture is delivered to more than 10,000 school children at over thirty centres. (The Institute has, on occasion, received small grants from Research Councils and other funders towards the costs of the tour). At our Annual Congress, we run a series of lectures for the public which, over three days, attracts upwards of 1,000 individuals from wherever Congress is held. In addition, the Institute has recently launched a scheme aimed at encouraging young physicists to hone their communication skills by giving public lectures in their localities. We also publish a widely available booklet giving the names of physicists who both have the necessary communication skills and are ready, willing and able to talk to audiences of adults or children. Preparation and dissemination of careers materials and teaching resources are also key elements of our programme.

All the above communication activities are funded by the Institute, sometimes enhanced by grants and sponsorships, in open competition. The Research Councils have their own programmes for communicating with the public and schoolchildren and some co-ordination of activities with those of the Institute is obtained through staff-level liaison and Institute representation on committees of EPSRC and PPARC. The Institute is, however, aware that more could and, indeed, should be done to obtain better co-ordination of our public understanding activities.

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* International Perceptions of UK Research in Physics and Astronomy (2000), a review sponsored by EPSRC, PPARC, the Institute of Physics and The Royal Astronomical Society.

The learned societies, as independent bodies reflecting and building on the wide scientific community and able to work both nationally and regionally, are crucial to the future of science and its exploitation for the benefit of the United Kingdom's health and wealth. They should be neither dependent on, nor divorced from, Government support and funding for science, but the two sectors should work collaboratively and openly, where appropriate, drawing on their differences and common features to promote their separate, but complementary objectives.

April 2002

APPENDIX 21

Memorandum submitted by the Institution of Chemical Engineers

INTRODUCTION

The Institution of Chemical Engineers is a learned, qualifying body and professional association for chemical and biochemical engineers, process engineers and related technologists.

The Institution is based in the UK, Incorporated by Royal Charter and enjoys charitable status.

Approximately 30 per cent of the Institution's 25,000 members are based outside the UK, principally in Australia, where the Institution has a branch office in Melbourne. The Institution's 85 staff are mainly based at the IChemE's principal office in Rugby, Warwickshire, with a small number of staff based at the Institution's London Office in Gayfere Street, Westminster, which are used principally for meetings.

The Institution is a Nominated and Licensed Body of the Engineering Council and a member of the Science Council. It provides the secretariat in the UK for the European Federation of Chemical Engineering and its Chief Executive is a member of the Executive Board of the World Chemical Engineering Council and Commonwealth Engineers' Council.

The IChemE has a turnover of approximately £5 million per annum, something under 25 per cent derives directly from membership subscriptions, the remainder from activities associated with publishing (journals, books and magazines), advertising (IChemE enjoys a leading market position in the advertisement of professional chemical engineering job vacancies), training courses, conferences and distance learning materials.

Beyond the Institution's freehold ownership of its premises in the UK, the Institution has modest financial reserves equivalent to a few months' working capital, and budgets to achieve a financial break-even over a cycle.

Until latterly, the Institution has received little direct financial support from Government or related sources. However, the industrial base to which chemical engineers contribute has been generous on a number of occasions, including funding for the purchase and development of the IChemE's principal offices, for the promotion of chemical engineering careers and to develop continuing education and CPD materials.

Chemical engineers work across a broad span of industries which have been disproportionately successful parts of UK manufacture, including chemicals, oil and gas, nuclear and other energy industries, biotechnology, food and drink, pharmaceuticals and cosmetics, water and other environmental industries, process plant manufacture and process engineering contracting. The UK generally enjoys a strong industrial position and positive balance of trade in these sectors.

The Institution's historic attitude to Governmental funding, which might be described as "wishing to stand on its own two feet" and not being beholden to public monies, was probably inherited from the independent attitude in the 1960s, 1970s and 1980s of the chemical and oil industrial base.

GOVERNMENT SUPPORT—THE CURRENT POSITION

The Institution's position on Government support has, however, modified and nowadays, on a project basis, is welcomed provided it does not prejudice the independence of the Institution's professional position.

In February 2001, the IChemE successfully bid for DTI support to assist with the development of IChemE's web-based learning portal. The IChemE received, up to 31 March 2002, £39,200 as part of the DTI Innovation and Skills Partnership scheme to provide a one-stop shop for purchasing and receiving training relevant to individuals in the process industries. Within the portal, conventional products are available for purchasing in addition to a new generation of e-learning products. DTI supported the project because they viewed it as a novel approach to improving skills in the chemicals sector.

More recently DTI funding of £1.2 million, in the period May 2001 to April 2004, has been provided for core infrastructure, training, technology exploitation, publicity, marketing and dissemination for the CRYSTAL Faraday Partnership in Green Chemical Technology. IChemE acts as the contractual partner with DTI, together with two other hub partners—Royal Society of Chemistry and the Chemical Industries Association. There is a possibility of additional funding being awarded for a two year extension to the project.

Earmarked EPSRC funding of £1 million has been made available for collaborative research projects in Green Chemical Technology, which has to be committed by September 2002.

In relation to both the DTI supported projects above, the Institution's positioning at the interface between the relevant academic and industrial communities has been shown to be a "winning card" in terms of providing an effective and unique network. This is evidenced in the Faraday Partnership where participants include 10 Consortia and Network Technology Organisations (CANTO), nine direct industrial participants with 40 more working through CANTO networks, and chemistry and chemical engineering departments from 19 universities.

CRYSTAL's mission is "to be the lead organisation for the research, development and implementation of green technologies and practices in the UK chemical and allied industries".

A professional Institution such as IChemE enjoys a more independent position than can be provided by an employer organisation or trade association when working in partnership with Government.

The role of the IChemE has also been recognised latterly by the European Union, which has also provided funding for a number of safety related projects. While technically outside the scope of the present inquiry, the Committee may be interested to know that, acting on behalf of the European Federation of Chemical Engineering, the Institution established at IChemE in 1995 the European Process Safety Centre. The Centre began a project, PRISM (Process Industries Safety Management) Network on Human Factors in April 2001 with an EU funded total support value of £256,000. Outcomes are to promote the concept of human factors particularly amongst small and medium sized enterprises and identify future research needs in the field of human factors in the process industries.

IChemE is also contracted into two other EU funded projects; ARAMIS, which began on 1 January 2002 with EU funded total value of support of £75,000, whose outcomes are to compare risk assessment methods across Europe and identify best practice in the field of risk assessment; and S2S (Safety to Safety), which is due to begin in June 2002 with total support value of £70,000, whose outcomes are to incorporate all the process industry networks within Europe and identify future research needs in the field of human factors in the process industries.

FUTURE PROSPECTS

While support from Government has, thus far, come principally from the Department of Trade and Industry, there is seen to be scope for equivalent project working in future with the Department for Education and Skills, and the Department for Environment, Food and Rural Affairs. Indeed, the Institution already provides, by way of comment on consultation documents and draft legislation, expert input on behalf of the chemical engineering community to documents issued by these Departments.

The chemical engineering profession sits at the very interface between energy and environmental affairs which are so important to the future sustainable industry. A current project about to be launched by the Institution is a set of metrics to measure progress in achieving sustainable development. This project has been entirely funded by the Institution but will provide, for the first time, a set of independent metrics to help engineers address the issue of sustainable development and enable companies to set targets and develop standards for internal benchmarking and to monitor year on year progress. It is hoped that the dissemination of this project will be promoted by relevant Government Departments.

Like other professional bodies, the Institution is active in seeking to recruit from the relevant cohort of school leavers into chemical engineering where there has been a decline in school leaving interest in recent years. While industrial support has been forthcoming for the "Whynotchemeng" campaign, the Institution was not successful in bidding for funds from the DTI to match the contributions received from industry and voted from the Institution's reserves.

The chemical engineering profession does not believe it receives value at present from pan-engineering initiatives which have received support from public funds. Expert input to Government from Institution members and from documents put together by the Institution is a major part of the IChemE's External Relations strategy, as is communicating relevant chemical engineering science and achievement to the public. This is done through PR campaigns and publishing. The Institution receives no public sector support for these activities.

IChemE would welcome the opportunity to present oral evidence to the Committee on the role of Learned Societies in communicating science to broader publics, attracting able cohorts of school leavers into science and engineering careers and in providing a unique opportunity for networking between academe and industrial practice, as has latterly been recognised through the DTI project funding received by the Institution.

In relation to other issues touched on in the inquiry, the IChemE is pleased to report that of the current intake into chemical engineering courses, approximately 25 per cent are female, a substantially higher proportion than in other areas of engineering. Further progress and initiatives to attract young women into chemical engineering would help to address the historic gender imbalance. Later this year, the Institution will have its first female President, Professor Dame Julia Higgins DBE, FRS FREng.

Further progress has been made overseas, notably in the United States and Australia, in attracting even larger numbers of women into chemical engineering and it is important that messages to this effect are carried out into the relevant target communities in the UK. It is encouraging to see an increasing number of senior role models in chemical engineering held by women.

April 2002

APPENDIX 22

Memorandum submitted by the Institute of Electrical Engineers (IEE)

Thank you for the invitation to the IEE to submit evidence to this enquiry. In doing so, we are restricting our comments to the area of which we have first hand knowledge, that is the contribution made by the IEE to providing scientific advice to Government and to communicating science and technology to the public.

IEE is a not for profit organisation, registered as a charity in the UK. Its income is mainly derived from its technical publishing activities and from Members' subscriptions. IEE commits well in excess of £1.5 million a year to education and public awareness activities. The annual cost of its Engineering Policy Department represents a further £430,000. With rare exceptions, noted in the detailed evidence attached, this work is carried out entirely at the IEE's own expense.

Founded in 1871, IEE is the largest professional engineering society in Europe and has a worldwide membership of circa 130,000 ranging from students to the most distinguished and highly qualified members of the profession. IEE represents a wide range of engineering disciplines including power engineering, electronics, communications, computing, software engineering, IT and manufacturing.

The IEE is keen to ensure that in framing policy and legislation the Government has access to the best professional engineering advice. IEE monitors Government and Parliamentary consultations and responds to approximately 30 consultations each year on subjects ranging from Renewable Energy to Innovations in Microprocessing.

In providing advice to Government, the IEE acts in accordance with the obligations of its Royal Charter and therefore particular importance is attached to reliable, authoritative advice in the fields of health and safety and environmental issues. It conducts proactive in-depth studies of key issues as well as responding to requests for comment.

An important recent example is the assistance provided by the IEE to the Stewart Enquiry into the possible effects on health of mobile phones. The IEE's Policy Group on the Biological Effects of Low-level EMFs monitors all published research on this subject world-wide and has compiled a database of research results, reviewing and adding approximately 1,400 new entries per year. This independent data was supplied to the Stewart Enquiry and formed a basis for the thorough review that was undertaken.

IEE organises a number of high profile activities designed to communicate science to the public. Principal amongst these is the Faraday Lecture tour which in 2001 was attended by approximately 25,000 students and reached a further three million in the UK, USA and Canada through a combination of satellite and cable broadcast and Channel 4 schools programming based on the lecture. Other examples are given in the accompanying detailed evidence.

IEE is convinced that one of the most effective means of achieving better public understanding of science and technology in the longer term is to support teachers. It therefore devotes considerable time and money to the provision of curriculum support. IEE initiated and piloted the Marconi Days scheme, in association with GEC, with the aim of increasing the number of teachers of electronics through the Design and Technology Curriculum. More recently IEE has become a national funding partner for the STEM (science, technology, engineering and mathematics) initiative being delivered through SETNET and is working with a major media partner to develop an exciting new Web-based project.

Dr Nicholas Moiseiwitsch
Head of Engineering Policy

Annex

1. The IEE's Mission Statement is "to advance and disseminate knowledge in our discipline and to enhance the quality of engineering professionalism available to the community".

IEE ROLE IN PROVIDING SCIENTIFIC ADVICE TO GOVERNMENT

Submissions to Government, Select Committees and other agencies

2. The IEE is keen to ensure that in framing policy and legislation the Government has access to the best professional engineering advice. IEE monitors Government consultations and responds to approximately 30 consultations each year on subjects ranging from Renewable Energy to Innovations in Microprocessing.

3. In formulating submissions, every effort is given to assembling diverse groups involving many different backgrounds and viewpoints. All submissions are approved on behalf of the Board of Trustees by the Chair of an expert group, appointed in consultation with his or her peers. The IEE takes this activity very seriously and has a dedicated staff function, the Engineering Policy Department, to oversee and administer the process.

4. The timescales set by Government for responding to consultations remain a problem, with many considerably less than the three months recommended in Government policy. IEE consults as widely as possible amongst its members but, clearly, the more time that is given, the more extensive is the possible consultation and the more opportunity busy expert members have to comment fully.

5. The drive towards "Open Government" means that Government Departments and other agencies increasingly consult by placing a consultative document on their website, without specifically inviting relevant organisations to respond. IEE monitors a large number of relevant websites in order to ensure that it is aware of the important consultations. However, direct invitations to comment are appreciated. From the Government's point of view there is very considerable benefit to be gained from inviting the IEE to submit evidence as it can be assured that the views expressed have been subjected to peer review. This point is further developed in the IEE's evidence to the Office of Science and Technology on "The use of scientific advice in Policy Making", a copy of which forms Appendix B to this evidence.

6. It is noted with interest that the Government's Ministerial Science Group, MSG, has undertaken to keep under review Departmental procedures for early anticipation and identification of issues for which scientific research or advice will be needed.* IEE would be keen to explore mechanisms by which early notice of forthcoming consultations could be received and to enter into dialogue with Civil Servants in the relevant Departments at an earlier stage on future policy issues where the IEE could be of assistance.

7. IEE co-operates with other Institutions and Societies such as the BCS, the IMechE and the IChemE. However its current policy is not the produce "joint" submissions with other bodies except on professional matters where the issues are mutual. The pooling of inputs to produce joint submissions adds to the time taken and generally leads to a more bland response. It is understood that recipients of advice would prefer to receive separate submissions so that any differences or similarities are apparent and can be aired and debated.

Biological Effects of Low-Level Electromagnetic Fields

8. The IEE Policy Advisory Group on the Biological Effects of Low-level Electromagnetic Fields monitors all published research on this subject world-wide and has compiled a database of research results, reviewing and adding approximately 1,400 new entries each year.

9. IEE publishes Policy Statements, updated every two years, on the basis of the peer-reviewed papers published during this period. These are available on the IEE website.

10. The IEE's database was supplied to the Stewart Enquiry and formed a basis for the thorough review that was undertaken. As a result of the Steward Enquiry, the Government has established the Mobile Telephone and Health (MTHR) Programme. This consists of 15 Government funded studies into the possible biological effects of mobile phones. Of these 15 selected studies, four involve members of the IEE Biological Effects Group.

11. In 2001, the IEE produced a FactFile, explaining in layman's terms the possible effects on health of low-level electromagnetic fields. Copies were circulated widely, including to MPs. It was also sent to local authorities and public undertakings to assist them in planning matters. IEE's independence was much appreciated by recipients. The FactFile is available for free download on the IEE website.

IEE Reports and Guidelines commissioned by Government

12. IEE has undertaken a number of major research projects for Government in the past years, with varying degrees of Government funding. The main examples are:

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* Guidelines 2000, Scientific Advice and Policy Making, OST, July 2000

- Software in Safety Related Systems: major research project funded by DTI and published in 1989 in order to raise awareness of software as a new risk issue.

  The IEE was also a founder member of the Safety Critical Systems Club, which was set up, with DTI pump-priming funds, to encourage the sharing of professional expertise in this area. The IEE's Professional Network on Functional Safety, which is due to be launched shortly, will continue to develop this area, co-operating closely with the Club;
- "Safety, Competency and Commitment: Competency Guidelines for Safety Related Systems Practitioners": published by the IEE in 1999, following a four year IEE/BCS project with funding from HSE and backing from the DTI;
- "Embedded Systems and the Y2k problem": major research and awareness project, largely at IEE expense, but with DTI funding for a specific sub-project;
- "To School or not to School": IEE Foresight Associate Project, published on the IEE website in 2001, on the role of ICT in primary and secondary education. This was funded entirely by the IEE.

13. The resource pressures on Institutions, coupled with the increased pressures on expert Members' time, mean that undertaking this type of project is much more difficult now than five or 10 years ago. IEE currently has no plans for projects of this nature, however, it is prepared to consider proposals for longer-term studies in fields where it believes it can really make a difference, provided they are fully or substantially funded by the customer.

IEE ROLE IN COMMUNICATING SCIENCE TO THE PUBLIC

Faraday Lecture series

14. The IEE Faraday Lecture was founded in 1924 to commemorate the life and work of Michael Faraday, and is now an annual tour, which visits up to 14 towns and cities throughout the UK. The Faraday aims to enthuse young people in the 14-16 year old age group about science, engineering and technology and to attract some of them into a career in these areas. The lecture is a live stage presentation using the latest technologies: sensors, web-cams, audio-visual inserts and multi-media together with lots of demonstrations and audience participation. Over 20,000 students, together with members of the general public, see the lecture in the UK and it is also received by satellite throughout North America, Canada, Mexico, Hong Kong and Europe. It is televised in Australia and New Zealand and, in the UK, Channel 4 record the lecture on which they base an educational programme for schools. In total the Lecture reaches in excess of three million television viewers.

IEE Christmas Lecture

15. This annual lecture is designed to bring to the notice of sixth form school children the services electrical engineering performs for the community. It is presented two or three times at the IEE's headquarters in Savoy Place and sometimes also in the Branches. The most recent Lecture was about the British Airways London Eye and offered an insight into the complex engineering design and construction methods that underpin this successful project.

PAWS Drama Awards

16. The PAWS (Public Awareness of Science) Drama Awards provide bursaries to television scriptwriters to enable them to develop ideas for drama with a science, engineering or technology (SET) flavour. In doing so they recognise the power of the mass media to influence people's perceptions through entertainment. In addition to the bursaries there are prizes for the best programmes to be broadcast with a SET base or containing elements of SET. There is a regular newsletter and workshops where writers meet engineers and scientists. The IEE has supported the scheme since its inception and each year hosts and sponsors the Awards evening.

Today's Engineers Painting Competition

17. This competition is designed specifically for primary schools (five to seven year old pupils) and has been running for eight years. It regularly attracts 10,000 entries from schools throughout the UK and is backed by a consortium of 15 bodies from the engineering world, with the IEE being the largest sponsor and providing project management. This is one of IEE's main contributions to SET Week and, in 2002, to SET Year.

National Exhibitions and Events

18. IEE also recognises the need to meet various members of the public face-to-face, particularly family groups, and staff attend a number of exhibitions each year. Typically this could include the British Association Festival; Tomorrow's World Live and the Imagineering show within the Town & Country Fair. Every effort is made to target exhibits to the science and technology national curriculum.

Campaign to Promote Engineering (CPE)

19. The IEE was one of the founding Patrons of CPE and has continued to support it. As well as being represented on the Board and, initially, providing accommodation for the Campaign's offices, the IEE representative chairs the CPE's Health Planning Group.

IEE Prize for Helping Disabled People

20. The IEE Prize for Helping Disabled People is a collaborative project, managed by the IEE and run in conjunction with "Young Engineers" with the support of the Campaign to Promote Engineering (CPE). Aimed at 11-18 year olds, this national competition promotes the major role played by engineering and technology in meeting the needs of people with disabilities and their carers.

Engineering in Health Week

21. This project has been running for six years and is supported by CPE and its Health Planning Group. The IEE is one of the sponsors of the week and provides the project management for it. The week consists of a series of high-grade lectures on health technology delivered by leading figures in the field. It is aimed at A level students to encourage them to consider this area as a career and is linked to the appropriate parts of the national curriculum. Originally based in London it has now added Birmingham and Glasgow as venues and attracts some 2,000 students each year. In 2002, Engineering in Health Week is badged as a contribution to SET Year.

Daphne Jackson Memorial Lecture

22. Organised by the IEE in conjunction with the Women's Engineering Society (WES) and the Institute of Physics (IoP), the annual Daphne Jackson Memorial Lecture aims to highlight the contribution that women make in the fields of science, engineering and technology and to promote engineering as a suitable, worthwhile and exciting career for girls.

Factfiles and Factsheets

23. The Engineering Policy Department produces a range of FactFiles and Factsheets on topical issues with an engineering dimension. They are suitable for non-engineers and designed to give unbiased factual information. Titles include "Nuclear Power in the UK", "The Environmental Effects of Electricity generation", and "Electromagnetic Fields and Health".

24. The Department also produces a large range of Health and Safety Briefings and Legal Briefings. These are available on the IEE website.

IEE Website

25. The IEE website, www.iee.org, is a major resource of information for Members and the public. Information on every aspect of the IEE's activities may be found on the website. For example, the Engineering Policy section contains the full text of all submissions made by the IEE to Government and links to factual information on a wide range of fields

IEE archives

26. The IEE Archives are available to the public and used by researchers, eg for TV programmes, events and exhibitions. They contain information about the development of electrical science and technology from earliest times to the present. There is visual and written material on the electrical industry, design, business and family history, and women in engineering. Information about the content of the collections is accessible to the public via the IEE website.

Curriculum Support for Teachers

Curriculum resource materials

27. The IEE produces a wide range of curriculum resources for primary and secondary schools to support the teaching of science, design and technology, ICT and careers. The majority of these are produced in collaboration with other partners. The resources include TV programmes, CD-ROM, software, books, videos, training materials for teachers and posters. Particular examples are:

- *Young Foresight*—a design and technology initiative for Year 9 (14 year olds);
- *Advancing Physics*—a new A level course developed with the Institute of Physics;
- *ICON Soft Electronics*—software for programming PIC (programmable interface controller) chips; and
- *Handbooks for Science Teachers*—set of three developed with the Association for Science Education.

STEM initiative

28. IEE has become a national funding partner for the STEM (science, technology, engineering and mathematics) initiative being delivered through SETNET. It is working with Channel 4 Learning to develop an exciting new Web-based project promoting careers involving the creative use of ICT and electronics.

IEE/NEC Teacher Awards

29. Now in its eighth year, this annual scheme provides awards for twelve teachers from primary or secondary schools, who through good practice, enthusiasm and dedication have encouraged students to develop a keen interest in subjects appropriate to electrical, electronic, and manufacturing engineering.

30. Although particularly appropriate for those teaching design and technology, information technology, mathematics or science, the awards are not restricted to teachers in any particular subject area. Nominations are welcomed from anyone with personal experience of a potential winner, whether as a current or past student, parent, school governor, colleague, adviser or an engineer who has links with the school.

SchoolNet

31. SchoolNet is the IEE School Affiliate Scheme, membership of which is free to secondary schools, sixth form and further education colleges. The scheme aims to support and enhance the teaching of science and technology at secondary level by disseminating information about the IEE's schools activities and resources, as well as details of other relevant materials and initiatives.

Electronics Education

32. *Electronics Education* is the schools magazine of the IEE. Published each term, in September, January and April, it is sent free to science and technology departments of all UK secondary schools as well as to Initial Teacher Training providers and many educational organisations.

33. *Electronics Education* seeks to be a resource for teachers, providing support in implementing the electronics content of the science and design and technology curricula at Key Stages 3 and 4 and in the sixth form. It covers electronics, computing, engineering careers and related topics, and reviews books, software and educational products. As well as informative articles, each issue features project work to provide teachers with ideas to pursue with their own students. These projects are contributed from various sources including pupils themselves.

Marconi Days

34. The electronics industry has, for some years, faced problems recruiting enough people at all levels. In a large part this is because only a relatively small number of schools offer GCSE electronics through the Design and Technology curriculum (about 20 per cent of secondary schools) which, in turn, means that only some 7 per cent of the cohort are opting for electronics. Recognising that the provision of sufficient teachers trained to teach the subject was vital, the IEE, with funding from GEC (as it was at the time), set up a pilot scheme to train teachers of electronics as an INSET project. The initial results were so encouraging that the Design & Technology Association (DATA), as the specialist body for teachers in this part of the curriculum, was invited to take on the management of the next phases of the project which attracted government funding. The IEE retains an active interest as part of the steering group and has accredited the work through it own Continuing Professional Development scheme—both for training of trainers and of teachers.

Other IEE Activities of Relevance to this Enquiry

IEE's qualifying role

35. IEE is a qualifying body for engineers in a wide range of engineering disciplines including power engineering, electronics, communications, computing, software engineering, IT and manufacturing. Employing organisations, clients and members of the general public can be assured that a Chartered Engineer qualified through IEE is a knowledgeable professional who will make recommendations and conduct business in a strictly professional manner adhering to the code of conduct and the ethical standards laid down by IEE. Engineers so qualified may describe themselves as Chartered Engineers and may use the designatory letters CEng MIEE after their names. Such clear designation assists the public in understanding where to obtain authoritative information and guidance.

IEE's Learned Society Role—Professional Networks

36. The IEE's learned society role is based on its 33 Professional Networks. Each Professional Network provides an interface for global networking between professionals with shared interests and needs and aims to meet those needs by providing focused technical events, papers and other products. The Engineering Policy Department draws on this framework to access experts in the appropriate fields when providing advice to Government.

Co-operation with EPSRC

37. IEE works actively with the Research Councils and especially EPSRC, in assisting in the setting of the national research agenda and supporting the interests of its large number of research-based members and affiliated companies. Such research involvement is also crucial to IEE as an internationally respected academic publisher. In practice, for example, IEE co-sponsors EPSRC events (such as the PREP conference—Postgraduate Research in Electronics, Photonics, Communications and Software); nominates IEE experts to senior EPSRC Committees and Colleges, and undertakes specific tasks for the Council, such as managing the recent OST-initiated International Review of Computer Science Research. In turn, senior staff members of the Councils are active in IEE affairs: The present CEO of EPSRC is a Deputy President of the IEE, for example.

Standards making—Wiring Regulations

38. IEE is responsible for publishing the UK National Standard BS7671: Requirements for Electrical Installations. IEE also publishes standards for ships and offshore installations. In association with these activities, IEE members and staff represent UK interests at a range of European and international standards meetings.

Scholarships and Grants

39. The IEE offers a significant number of awards to assist members and students with undergraduate studies, postgraduate research and international travel. The annual commitment in terms of the above awards is approximately £142,000.

40. The postgraduate awards are intended to assist with research in the fields of electrical, electronic, manufacturing and information engineering. The awards range in value from £1,000 to £10,000 per annum. The premier postgraduate award offered by the IEE is the Leslie H Paddle Fellowship which is available to assist members of the IEE with research which is in the forefront of technology related to Electronics or Radio Engineering.

41. Undergraduate scholarships and grants are available to assist students and members with their studies on an IEE accredited first or MEng degree. The awards range in value from £500 to £750 per annum and are open to students who have demonstrated a keen interest in mathematics, science and engineering. Applicants are expected to have attained exceptional results in their A Level, Higher, Advanced Higher or vocational qualifications or during the course of their university studies. The Jubilee Scholarships are the premier undergraduate award. These have a value of £750 per annum and are open to students who are to enter an MEng degree at the start of each academic year in September.

42. A number of Prizes are also offered for academic excellence on an IEE accredited first or MEng degree.

43. Travel awards are available to assist members with international travel related to research, professional interests, training, professional development and the presentation of papers.

April 2002

APPENDIX 23

Memorandum submitted by the Institute of Mechanical Engineers

In our last financial year (January–December 2001), the Institution's total income from all sources was approximately £19.8 million. Only a tiny fraction of this (£0.12 million) was directly from central government departments, and all of that was for specific projects, viz:

Sponsorship of Manufacturing Excellence Awards (DTI)—£50,000

Administration of BEP Biothrust Challenge (DTI)—£47,000

Administration of Whitworth Scholarship Fund (DES)—£24,000

The bulk of our income comes from membership subscriptions, publications and events. Many engineers within central government are members of IMechE and/or purchase our publications or attend our events, so some of this income will inevitably come from departmental budgets, but it is not possible to put an exact figure on this.

We provide advice to government mainly via responding to government consultations on matters relevant to mechanical engineering (eg energy policy, transport systems, manufacturing competitiveness) and through occasional parliamentary/ministerial lobbying activities. We are involved in communicating engineering and technology to the public mainly via various schools initiatives, open days, local and national news media and our web site.

I would like to turn now to our own views on government funding of the scientific learned societies, most notably RAEng and RS. We applaud much of the excellent work done by these bodies. The RAEng's Ingenia publication is highly commendable, for example. We also admire their ability to raise substantial funds from industry in addition to grant in aid moneys received from central government, and recognise this as a good indicator of the quality and relevance of the work they do. We would, however, like to make the following additional point:

Science is a vital part of the innovation process, but it is engineering that transforms scientific understanding into the innovative, successful technologies that society needs and desires. It has long been recognised that the UK is excellent at science, but lags other nations in the exploitation of that knowledge. The current imbalance between government support for science and that for engineering seems symptomatic of this trend. Until government recognises that engineering excellence is every bit as vital to the UK as scientific excellence, we will never close the competitiveness gap that exists between us and many other nations.

Sir Michael Moore KBE LVO
Director General

April 2002

APPENDIX 24

Memorandum submitted by the Linnean Society of London

A. INFORMATION ON THE HISTORY AND ACTIVITIES OF THE LINNEAN SOCIETY

1. The Linnean Society, founded in 1788, is the world's oldest continuously active natural history society. Its mission is to promote the study of the biology of whole organisms by persons at all levels of age, background and expertise. It was at the Linnean Society that Charles Darwin and Alfred Russell Wallace first made public their thoughts on the origin of species. The society has maintained this tradition by subsequently continuing to sponsor ground-breaking work in many relevant areas of natural history.

2. The Society's members include both amateurs and professionals. The categories of membership (with standard annual subscriptions in brackets) are: Fellows (£40), Associates (over 18 and under 29 years of age, £24) and Student Associates (over 18 and under 24, £9). In terms of ethnicity, nationality, social background, age and gender, the society's fellowship has always been diverse. The one proviso of fellowship is an active commitment to the pursuit of biology and natural history. The Linnean does, however, pride itself on having been the first learned society in Britain to admit women fellows, and women have long ranked among its officers, presidents and most distinguished members. The Society has an open and democratic constitution dating back to its 1802 Charter. Members are drawn from 93 countries; 36 per cent of the UK membership live or work in the Home Counties.

3. The Society organizes a programme of meetings throughout the year, in which the general public are welcome to participate. It publishes three learned Journals of Biology, Botany and Zoology, which have international stature in terms of their editors, contributors and readers. The Society also produces a highly regarded Members' newsletter *The Linnean*, the *Synopses of British Fauna*, with occasional and special publications. Each year there are in total more than 40 issues of all these. Papers are subjected to rigorous peer review. The journals help to maintain the perception of Britain's leadership in biology.

4. It awards small grants to support research in a wide variety of scholarly studies in natural history and systematics, to give assistance to serious natural historians in the UK and abroad, and to help young PhD students. It awards a variety of medals and prizes—for example, a recent obituary of the internationally distinguished US naturalist, Richard Evans Schultes, referred to his receipt of a Linnean medal as the equivalent of a Nobel Prize. The various other awards go not only to professional and amateur natural historians, young and old, but to botanical artists as well. We also offer an annual prize for the best PhD thesis in plant sciences. Grants are available to support research by those no longer in full-time employment, and to pay the subscriptions of those unable to afford them, eg Members in Eastern Europe, Africa or Asia.

5. The Society has strong overseas connections with occasional meetings abroad. For example, we are determined to go ahead with a meeting in Pakistan on the natural history and archaeology of the Hindu Kush either later this year or early next year since this will bring together scientists from the West and from Muslim countries. The Society also makes grants every other year for work in tropical African botany, which have involved scientists from a range of African countries.

6. The Society holds in trust for the benefit of scientists across the world the botanical and zoological collections, library and correspondence of Carl Linnaeus (comprising over 25,000 items in all). Apart from the extraordinary historical value of these 18th century holdings, they are the very scientific reference specimens (types) on which the names used today for many well-known plants and animals are based. The Society's holdings are, therefore, an exceptional resource for researchers both in taxonomy and the history of science and are curated to the highest standards for inspection by scholars and natural historians. We have embarked on a programme to make available all our collections, for free, on to the world-wide-web so that they can then be viewed by anyone with access to the Internet.

7. The Society's library, in continuous operation since our founding in 1788, is consulted (free of charge) by scholars from all over the world.

8. The Society has initiated—either alone or in partnership—a number of major national and international projects in systematics and conservation of biodiversity. For example, for many years in the first half of the 20th century the desirability of a Flora of Europe had been evident. In 1957, with the aid of a starter grant from the old DSIR, the Linnean Society became the sponsor of the Flora Europaea project, which was successfully completed only in 1980; the five volumes comprising the Flora represented the work of 187 botanists in 24 countries, and covered 11,557 species. This work continues with a major grant from the EU Framework 5 programme. With partners on the mainland of Europe, we also obtained Framework 5 funding for an even more ambitious *Fauna Europaea* project to cover all the animal species of Europe. Both these initiatives were taken forward by some of our members as a result of a Linnean Society meeting held in Leiden in 1995. The Society also sponsored Prof R J Berry's project *Biological Recording: Need and Network* which foreshadowed the National Biodiversity Network. Outside Europe, the Society contributed to the 1988 Kimberley bicentenary expedition in Australia.

B. GOVERNMENT FUNDING

9. *Recurrent funding.* The Linnean Society receives no recurrent government funding.

10. *Project funding.* On a few occasions post-war, the Linnean Society has been involved in government-funded projects. An early example was the *Flora Europaea* project (see paragraph 8 above) where the Society administered the Trust that was established with the DSIR grant, coordinated the voluntary participation of many professional botanists from a variety of countries, and oversaw the final publication of the *Flora*. In 1993 and 1995, grants from DFID allowed the Society to mount two meetings on Brazil. More recently, after OST funding for The Systematics Forum expired, the Society commissioned a report on its activities and future prospects and is exploring ways of ensuring continuation of its activities for specialist groups of systematists, alongside its long-standing specialist groups in computer applications, evolution, freshwater biology, palaeobotany, palynology and plant anatomy. The Society has administered for many years the NERC Fund for Taxonomic Publication.

11. *Premises.* In 1854 the Government purchased Burlington House to fulfil a historic obligation to accommodate certain scientific societies, and in 1856 allocated some rooms in it for the use of the Linnean Society. The location of the present day rooms is different due to changes elsewhere in Burlington House. The precise legal status of the terms and conditions of occupation of these rooms by the Society has been the subject of ongoing discussion with government for a number of years. At present, the Linnean Society carries responsibility for their upkeep, maintenance, decoration, cleaning, security and other running costs, as well as for conformity with legislation such as that for Health & Safety.

12. Our rooms are made available for meetings of a range of other learned societies and relevant charitable organizations at modest rates. The Society has participated in London *Open House* during which some hundreds of people have visited the Society's rooms. Two pamphlets on the building and the Society have been produced for these occasions.

C. Advice to Government

13. Over many years the Society has given advice when requested to government and NGOs on matters concerned with natural history, systematic biology and conservation. Ten years ago, a House of Lords Select Committee on Science and Technology chaired by the late Lord Dainton published a report highlighting the parlous state of research in systematic biology; two former Presidents of the Societies were the Committee's specialist advisers, and the Society was amongst those submitting detailed evidence.

14. In the past 12 months we have commented to DETR, now DEFRA, on the quinquennial review of the Royal Botanic Gardens at Kew, to the former DETR on the government draft report under the UN Biodiversity Convention, to DEFRA on its proposed research strategies, and to NERC on its research strategies.

15. In the case of DEFRA and NERC, although both have indicated the importance of the conservation of biodiversity, neither provides the means to do it by supporting the kind of research in systematic biology that is essential to underpin any comprehensive programme of biodiversity conservation. We therefore felt obliged to submit our views to the current House of Lords Select Committee in Science and Technology enquiry into Biodiversity and Systematics earlier this year—a continuation of the enquiry mentioned in para 13 above. The President of the Linnean Society also gave evidence in person to the Committee.

16. Because of the general concern about the parlous state of research in systematic biology in the UK, in 2000 we contacted 27 other Learned Societies interested in aspects of the subject and arranged two meetings for their representatives. The outcome was a document outlining both the problem and a possible solution to it, which was then sent to the Government Chief Scientist and the Minister for the Environment in July 2001. Again, we have the feeling that firm support will be lacking from either quarter.

17. Through its representative on the Council of the National Trust, the Society has contributed to the recognition by the Trust of its responsibilities for biodiversity conservation and land management, as well as the upkeep of its buildings. A former representative of the Society was instrumental in introducing a deer management programme for the Trust's land.

D. Communicating Science to the Public

18. The Society has sought, so far unsuccessfully, to become a registered museum, which would allow it, through eligibility for various grants, to become more accessible to the general public. At present, the "public" with which the Society communicates may be considered in four categories: school students; those non-professional biologists in the UK with serious interests in aspects of natural history; certain organizations in other countries; the global community of workers in biology and its associated professions.

19. The Society's Schools Programme has involved arranging meetings in various parts of the UK primarily for sixthformers interested in natural history. To this end, the Society has a coordinator of its schools' programme on its Programmes Committee. In April 2001, with the Society for Experimental Biology, the Society's President chaired a panel discussion at the University of Kent at Canterbury involving some 60 sixthformers from local schools. In January 2002, our coordinator, Ms. Mary Griffin, organized a successful Saturday morning event in Dublin for sixthformers, teachers and advisers, attended by over 100 people. Both the Canterbury and Dublin meetings were concerned with current ethical problems in biology. We are seeking to fit our own programmes into the new curricula in schools.

20. With regard to amateur naturalists, they are welcome at any of our meetings whether or not they are members of the Society, and the Society's Programmes Committee welcomes any suggestions for meetings on appropriate topics. Apart from our Journals which are very much aimed at professionals, we publish a variety of types of books of interest to a wide audience (see www.linnean.org), the latest to go to press being on wildlife and roads. Three display cases containing artefacts and representative biological material are made available to the public in the foyer of the Linnean Society (10-5pm on weekdays other than Bank Holidays). The Society's rooms are used by other societies and organisations 400 times a year, so providing access to the foyer exhibition and to some 50 framed portraits of biologists hanging throughout the building. Visiting groups receive conducted tours by staff by appointment.

21. With regard to the international scene, a good example is the preparation for events to celebrate the tercentenary of Linnaeus' birth in 2007. The President has already visited Sweden to participate in a meeting to plan a range of public events, television programmes, a new visitor centre, etc, and to explore how the Society can be of assistance. Additionally, we have already delegated to one of our Council, Dr. Jenny Edmonds, of Leeds, the responsibility over the next five years for coordinating various activities for a parallel celebration of the enormous contribution to science made by Linnaeus.

E. General Views on the Role of Learned Societies

22. In the field of natural history, we are alarmed at the declining state of research into systematics and whole organism biology in institutions, and its virtual disappearance in universities (see paras 13 and 15, above). Likewise, education in these subjects in schools and universities is in a parlous state, despite the widespread lip-service paid to the "importance of conserving biodiversity". We have now reached a stage

where, for example, there is now no longer any expert employed anywhere in the UK by either government, museums or universities who can authoritatively identify a number of major groups of fungi (including, eg, mushrooms and toadstools, let alone potentially disease-causing organisms in animals and plants). It is difficult to conserve species (or, indeed, to conduct any other work with them) without first having located, identified and studied them. These are all functions of systematic biology. But this discipline, the grammar and syntax of biodiversity studies, is increasingly disregarded. The Linnean Society is determined to ensure that the basic (some might complain, traditional) skills needed to meet a very modern challenge are upheld and understood. In its furtherance of this aim, the society would benefit from Government recognition.

23. The UK systematics crisis compares unfavourably with the situation other nations. In the United States, for example, Federal, State and private support has encouraged botanic gardens and learned institutions to sponsor a great revival of interest in natural history and systematics. The New York Botanical Garden teaches natural history to schoolchildren from every age group and background and has come to be seen as a vital educational resource. At the same time, the garden's library and herbarium are home to more PhD candidates each year than the total of UK doctoral students in systematic botany—and the New York Garden is only one of several such institutions in the USA. Learned societies like the Linnean could, with suitable encouragement develop similar initiatives in the United Kingdom.

24. The tradition of the amateur naturalist is a strong one in the UK, and it is catered for by a wide variety of learned societies (some very small, with perhaps only 100 or so members). In the UK, professional taxonomists are complemented by their amateur colleagues in many areas such as bryology, entomology and mycology. The Linnean Society, with its central location and Meeting Room, Council Room, Committee Rooms and Library, is able to encourage and support both amateur and professional taxonomists, whose expertise benefits the furtherance of our knowledge of biodiversity and sustainable use of our natural resources in both education and research.

April 2002

APPENDIX 25

Memorandum submitted by the London Mathematical Society

I am writing on behalf of the London Mathematical Society, which is the principal learned society for mathematics in the United Kingdom, and which serves the whole United Kingdom mathematical community.

The Society does not receive any current funding from the Government, nor any project grants. It owns its own premises and receives no subsidy for this.

The Society gives scientific advice as the occasion demands, either directly to ministers and their departments, or through the Office of Science and Technology or through the Parliamentary and Scientific Committee. It does this both on its own, and jointly with the Council for the Mathematical Sciences, either directly or through bodies such as the Science Council, the Advisory Committee for Mathematical Education and the Joint Mathematical Council of the United Kingdom.

The Society's main aim in promoting mathematics is met at the university level. It does however each year organise a series of Popular Lectures, which take place in London, Scotland and another variable venue in England. These lectures are for a general audience, and are well received. The Society also promotes the Holgate Lectures, which are given in schools for an audience usually drawn from a group of schools, and are given by academic mathematicians.

The Society would also like to give its views on government funding of the Royal Society, with which it has had good and strong connections. The most important feature of the Royal Society, in our view, is that it sets and maintains the highest possible scientific and academic standards. This is essential to maintain the United Kingdom's strong scientific position in the United Kingdom. We feel that it is essential for the Royal Society to continue to set and maintain these standards, particularly when making election to Fellowships.

There are several ways in which the London Mathematical Society interacts with the Royal Society. Until recently, the Royal Society was the adherent body to the International Mathematical Union, the international body for mathematicians which is responsible for the four-yearly International Congress of Mathematicians. This role has ben taken over by the London Mathematical Society, but we value the role of the Royal Society membership of the International Council for Science (ICSU). The Royal Society also provides helpful financial support for attendance by our delegates at the meeting of the International Mathematical Union which precedes the Congress, and plenary speakers and invited lecturers at the Congress. We feel that this international role is an important one for the Royal Society, and that although dependent on government money it is best carried out by an independent body such as the Royal Society.

We also welcome warmly the award by the Royal Society of various research fellowships, from University Research Fellowships for young scientists to Research Professorships for outstanding world class scientists. We have great confidence that because of its own expertise the Royal Society has excellent appointment procedures and makes outstanding appointments. The programme for University Research Fellowships has developed enormously in recent years, and helps meet the needs of Science in society by supporting excellent young scientists, and by ensuring an appropriate spread through scientific disciplines, and in doing so helps meet the needs of young women scientists.

Professor J T Stuart
President

April 2002

APPENDIX 26

Memorandum submitted by the Medical Research Council (MRC)

MRC FELLOWSHIPS

Provision of training and career opportunities for clinical and non-clinical scientists is a key part of MRC's strategy. MRC provides 400 (at any one time) fellowships, with a value of £20 to £25 million pa. Support is provided through a comprehensive portfolio of personal award schemes ranging from pre/postdoctoral research training fellowships to career development opportunities for senior principal investigators.

MRC currently operates seven fellowship schemes; in 2001–02 463 applications were received. So far this session 57 awards have been made and it is expected that a further 26 awards will be identified over the next month bringing the total to 83.

1. *Processing costs*

The total cost of processing all fellowship applications in 2001–02 was £102k, including some of the administrative costs that can be easily quantified, eg attendance fees for Panel Members and domestic expenses such as travel and accommodation. Infrastructure costs including IT resources, stationery costs etc cannot be easily estimated and are not included in the financial estimates below.

The average cost per application is £220 (£102k/463)

2. *Summary of Schemes*

At each stage, separate schemes are tailored and targeted to the needs of clinical or non-clinical researchers.

Clinical Fellowships, open to doctors, dentists, GPs, nurses and other professions allied to medicine;

The *Clinical Research Training Fellowship* is the entry level or junior clinical fellowship and provides up to three years support for clinically qualified and active researchers to undertake a PhD. There are currently around 150 fellows and the award provides a salary, fixed level research support and conference allowance, Average lifetime value £128k.

The *Clinician Scientist Fellowship* is MRC's intermediate clinical award, providing support for either four or five years depending on clinical commitments or tenure track commitments from the Host University. There are currently around 50 fellows and the award provides a salary, support staff, consumables, equipment and conference allowance. Average lifetime value £545k.

The *Senior Clinical Fellowship* is a senior award for independent scientists/team leaders providing up to five years support; awards may renewed for a further five years in open competition. There are currently around 16 fellows and the award provides a salary, support staff, consumables, equipment and conference allowance. Average lifetime value £805k.

NON-CLINICAL FELLOWSHIPS

The *Research Training Fellowship* is the junior non-clinical fellowship, providing support for up to three years for early post-doctoral research training. In recent years the scheme has not attracted many high quality applicants and it is planned to subsume into the intermediate scheme. There are currently around 45 fellows and support provided includes a salary, fixed level research support and conference allowance. (Scheme under review, no average costs available)

The *Career Development Award* is the intermediate non-clinical award providing up to four years support. There are currently around 50 fellows and the award provides a salary, support staff, consumables, equipment and conference allowance. Average lifetime value £439k.

The *Senior Non-Clinical Fellowship* is a senior award for independent scientists/team leaders providing up to five years support; awards may renewed for a further five years in open competition. There are currently around 40 fellows and the award provides a salary, support staff, consumables, equipment and conference allowance. Average lifetime value £855k.

STRATEGIC FELLOWSHIPS

Most fellowship schemes are open to applicants across the MRC's remit. However, a number of Special Training Fellowships have been established to encourage research and increase workforce capacity in strategically important areas. These awards tend to be focused at the junior/entry level and awards are currently available in Bioinformatics and Neuroinformatics, Health Services Research and Health of the Public and Computational Biology.

3. *Key Features*

Part-time Awards and Career Breaks

MRC operates all of its fellowship schemes flexibly, there are no age limits for any of our schemes and consideration is given to applicants returning to science following a career break. Part-time awards will be considered for fellows with domestic responsibilities, and in exceptional circumstances for individuals with clinical commitments, in particular specialities or for particular groups, eg GPs.

Awards can be held in abeyance for up to one year, normally to allow the fellow to undertake a concentrated period of clinical training; extended periods of maternity leave are also supported. All abeyance requests are considered and a decision based on an evaluation of the best interests of the project and the fellow's future research career.

Mentoring

Informal mentoring structures are in place for all junior and intermediate fellows whose applications are supported by a sponsor or supervisor in their host department. More formal external mentoring programmes exist for the awards offered in partnership with the Academy of Medical Sciences.

Interdisciplinary Research

At the heart of our mission MRC aims "to provide a range of funding schemes and opportunities designed to support the best science, and scientists, across the full spectrum of research disciplines relating to human health, and to encourage innovation and interdisciplinarity." *Extract from MRC Strategic Plan 1999–03.*

Fellowships make a major contribution to MRC's portfolio of interdisciplinary and multidisciplinary research. This approach is encouraged particularly at the junior and intermediate level where applicants have the opportunity to undertake periods of training overseas, in UK industry or at a second research centre. The aim of such periods is to broaden the fellow's research experience and benefit longer-term career development while providing access to techniques, skills and facilities not available in the host department or institution. In addition fellows are encouraged to develop collaborations to facilitate interdisciplinary research and joint supervision is also encouraged where appropriate.

MRC also provides a number of joint fellowship awards in partnership with other funding bodies such as the Department of Health, other Research Councils (currently PPARC and EPSRC) and some of the medical Royal Colleges. These partnerships have developed to promote interdisciplinary mobility between the physical and life sciences and where a need has been identified to build the clinical academic base.

June 2002

APPENDIX 27

Memorandum submitted by the Natural Environment Research Council (NERC)

1. An analysis of the cost efficiency of Fellowships and other training schemes, indicating whether accounts isolate associated administrative costs:

It is difficult to disassociate the administration of our Fellowships from that of our other schemes. However, there is no reason to assume that the efficiency of the administration of Research Fellowships is any different to that of our other schemes. The NERC Operating Plan calculates NERC's overall administration costs to be 4.1 per cent.

2. A comparison of the characteristics of our schemes, for example career breaks and mentoring:

A summary of Fellowship schemes is provided below. Full details can be found on our web site at: http://www.nerc.ac.uk/funding/forms/fellbook2001.doc. The NERC Fellowship scheme is intended to provide opportunities for outstanding environmental scientists to develop, establish and maintain an international reputation in environmental research. Awards are available at three different levels, each corresponding approximately to different stages in an academic career.

Postdoctoral Research Fellow

Three years (+ two extension years*)

Recurrent grant of £7k pa

Early career development award, to provide further post-doctoral experience and to support outstanding environmental scientists as they become independent investigators. Up to one year can be spent at a collaborative institution in the UK or overseas.

Advanced Research Fellow

Five years (+ five extension years)

Recurrent grant of £8k pa

To enable outstanding early/mid career researchers to develop into team leaders of international standing. Up to two years can be spent at a collaborative institution in the UK or overseas.

Senior Research Fellow

Five years (+ five extension years)

Recurrent grant of £10k pa

To enable proven researchers of international standing at mid/peak career level (eg HEI Readership level) to devote themselves to personal research. Up to two years can be spent at a collaborative institution in the UK or overseas.

Our Fellowship schemes have standard "characteristics" with respect to issues such as career breaks and mentoring. NERC Fellowships are also covered by sickness, maternity and paternity provision. As part of NERC's policy of promoting equal opportunities, Fellowships may be held on a part-time/flexible basis if required, and Fellows may, subject to NERC approval and the support of the host institution, move to part-time or more flexible working if their personal circumstances change.

NERC expects host institutions to carry out regular appraisals of all Fellows. Appraisals will normally be undertaken under the regulations and mechanisms of the host institution and should enable the department and Fellow to form the best possible assessment of, and feedback on, the individual's performance and future development. Appraisals should include consideration of in-service training requirements, career guidance and personal development.

In addition, NERC co-sponsors a number of Fellowships with the Daphne Jackson Memorial Trust, which are aimed at providing opportunities for scientists to return to research following a career break.

3. *An explanation of how schemes deal with applications for interdisciplinary research*

For convenience, our applications are classified into five areas (atmospheric, earth, freshwater, marine, terrestrial). As with all classification systems, it is inevitable that some applications cross the boundaries, and indeed NERC encourages interdisciplinary research. In such cases, one of the five committees will take the lead in assessing the proposal, although views will be sought from the other relevant committee(s), and the wider science community in the case of peer review. The applicant will be advised of which committee is taking the lead, and is able to discuss this with NERC if there are any concerns. Applicants are also provided with the names of the panel members before the interview.

It should be noted that one of our successful applicants this year is carrying out research that cuts across both the atmospheric and earth sciences.

APPENDIX 28

Memorandum submitted by Dame Bridget Ogilvie

Further to your ongoing enquiry into the Government Funding of the Scientific Learned Societies, I would like to make the following points and submit the attached documents as written evidence:

I have already submitted my resignation notice, but for completeness I attach it again.**

1. The minutes from the last four Copus Council meetings,** which clearly indicate a consensus about the way forward for Copus as a strategic focus for science communication, and a number of areas of work agreed by Council. The ideas presented in these minutes illustrate a useful role for remodelled Copus that fills a crucial gap in current science communication activity. This new and agreed role suggests that the remodelled Copus has made much further progress on paper than its founding organisations will give it credit for in

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* Applications for extensions to existing Fellowships are considered in open competition with applications for new Fellowships.

** Not printed.

public. Their suggestion that the new Council has little idea of what to do lies uncomfortably with their previous support for the re-modelling, and with the fact that these minutes were accepted without comment or dissent in their presence.

As I have previously made clear, I have no problem with the current activities that occupy the time of Copus staff—it is simply that Copus Council does not need to exist for them to take place, and I can no longer endorse a programme that claims to have recruited dedicated staff to work on the remodelled Copus, when in fact, almost all their time is taken up with running previously existing programmes. The Royal Society makes very clear that in its view the grant schemes are the most important raison d'etre of Copus. However, the grants are allocated by a separate committee of the Royal Society, and do not need the time or expertise of a further group such as Council in order to function.

2. The issue of how Copus is financed is an important one, because at the moment the advice and input from Council members is wasted, as they have no knowledge of the Copus budget and no influence over how it might be spent. Information on budgets has been scant—the only documents I have seen are a scratch paper tabled at the Council meeting last May,* and the draft budget for the so-called business plan produced by the Royal Society just before the Council meeting in May 2002.*

In the minutes you will note Council's support for the idea that Copus underpin the forthcoming ECSITE conference as means of establishing an audience with an important group of stakeholders—the European network of science centres. Despite the fact that Council endorsed the proposal twice, Copus has not been able to make the commitment to the project as its expenditure is subject to Royal Society preferences and priorities, and not those identified by Copus Council. This begs the question yet again, what is the point of seeking advice from a community of leaders in the field of science communication if their advice can only be implemented with the further agreement of one of the players? Their role can no longer be to advise the three founding organisations on their science communication policies, as each organisation now has its own programmes of thriving activities and corporate advice mechanisms in place.

3. The Royal Society's attitude towards Copus is clear from the Business Plan that was submitted embarrassingly late before the last Copus Council meeting. I only received the first draft less than 10 days before the meeting. It read more like a warning about what Copus shouldn't be getting involved with, rather than a strong case for raising funds for the remodelled Copus; it made little reference to the work areas agreed by Council, and those it did refer to it misinterpreted at a fairly fundamental level. The Royal Society offered to write the plan at the January meeting. It completely ignored the initial draft that Copus staff were asked to prepare as a matter of urgency after the meeting, and which I include here* as I feel it summarises the agreed objectives, strategic aims and action points agreed by Council members during meetings I have chaired.

4. My final point concerns constitutional and governance issues. As I indicated in my verbal evidence to your Committee, I am the first to agree that organisations will be measured by what they achieve, rather than how they are constituted. However, when the constitution hinders the evolution, implementation and delivery of agreed objectives, then there is a significant problem that needs to be addressed. Copus Council agreed that a report about the terms of reference, governance etc of Copus should be commissioned, which is how the Jamieson report* came about. You will note from reading it that it makes no particular recommendations about the way forward, but does present a number of suggestions. The discussions at the meeting are minuted as follows:

"Council considered the Jamieson review about what would be desirable and/or feasible for terms of reference and constitution for the remodelled Copus. Council agreed that, for the moment, Copus should remain an unincorporated body hosted by The Royal Society, but that its relationship with The Royal Society and the other sectors on Council should be clarified via a memorandum of understanding.

As the remodelled Copus evolves and develops its revised remit, it might be appropriate to consider a more independent constitutional arrangement that would enable Copus to become a membership organisation for science communicators. It was agreed that The Royal Society, which is currently accountable for Copus, should take this forward in collaboration with the Chairman."

The Royal Society has interpreted this as Council's agreement to retain the status quo as an unincorporated body within the Royal Society for the next three to five years. No attempt has been made to prepare a Memorandum of Understanding. I find this somewhat disingenuous, and even, to my mind, a rather strange version of the current situation, as Copus has absolutely no legal status—unincorporated or otherwise.

As I have stressed before, it is a matter of immense regret that it has not been possible to move Copus forward. The time, support and goodwill I have received from leading figures in the community only serve to re-emphasise my conviction that there is a need for an umbrella body of some sort within the field of science communication. I do not believe that the concerted brains and expertise of Council members and OST would have invested this much time and energy in developing such a project if it was not important. It is a matter of concern that some of the principal bodies involved in this field cannot see the potential for such a body, and are too defensive and shortsighted to believe that they might have something to learn, as well as lots to give, to such a collaboration.

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* Not printed.

APPENDIX 29

Memorandum submitted by the Office of Science and Technology (OST)

ANSWERS TO QUESTIONS FROM THE SELECT COMMITTEE

1. *The extent of OST's involvement in the discussion concerning reform of Copus?*

OST has been involved in regular discussions with Copus over its role and workplans.

Lord Sainsbury has taken a personal interest in the reform of Copus. He attended a Copus Council meeting in November 1998, where he suggested that Copus might give further thought to its future role and that it might be time for it to take a more strategic role in the development of science communication. The Minister and OST officials have also commented on Copus's plans for reform both at Council meetings and directly to the Copus chair, Council members and the Copus manager. (OST, is not a member of Copus Council, but occasionally sends an observer to its meetings by invitation.) Lord Sainsbury also attended a Copus Council meeting in September 2001, where he offered his views on Copus's work.

More recently, following the resignation of Dame Bridget Ogilvie as Copus chair, OST has discussed the future role of Copus with a range of key stakeholders.

2. *What consideration OST has given to the methods and routes by which Copus is funded, and whether these are likely to change?*

OST will be considering the most appropriate funding routes for Copus in the light of the outcome of the discussions on the future of Copus which are being led by Lord Jenkin.

3. *What input OST has into the distribution of the Royal Society's non-hypothecated grant-in-aid, in particular the £810,000 spent on Science Communication?*

The whole of the Parliamentary Grant in Aid (PGA) from OST to the Royal Society is hypothecated, in the sense that it is given for a group of clearly identified purposes; there is no "unallocated head-room" and no portion of the PGA which is given on, for example, similar terms to a HEFCE block grant.

There are working level meetings, typically half-yearly, between OST and the Royal Society, where the latter reports on progress in relation to the objectives for which Grant in Aid has been given.

The annual financial returns made by the Royal Society to OST are required to indicate the actual outturns against the various activity headings in comparison with the original estimates.

At each spending review the Royal Society submits a detailed spending plan for each line item. For example the line item "Science Education and Promotion" (which in the question is referred to as Science Communication) details the allocation and spending plans for all the activities which comprise this line item, which are, science education, the Society's own PUS activities, Copus, the Royal Institution and the British Association grant.

Once the spending plans have been agreed the Society may not vary the spend between the three major blocks without the approval of the OST. The Society may vary the spend within those blocks but must inform OST before it does so.

The Society provides the OST with audited accounts each year which report on the actual expenditure for each activity. The Society will for the first time this year also provide OST with a report on outputs and outcomes for each activity supported through the Parliamentary grant.

4. *What is the Department's view of the recent developments at Copus and the best way forward?*

OST shares the disappointment expressed by Dame Bridget Ogilvie that she was unable to implement the vision for the "new" Copus. OST welcomes the proposals that Lord Jenkin has tabled for discussion on the future of Copus. We believe that Copus needs independence, a constitution and clear decision-making mechanisms. We see Copus's main role as providing advice to Government and others on science communication matters—as opposed to advice on specific issues of science—both proactively and reactively. It should promote co-ordination and co-operation amongst organisations and individuals active in public engagement with science, engineering and technology issues.

It should identify gaps and overlaps and encourage the appropriate players to address these. Copus should not undertake activities that other bodies are better placed to do.

June 2002

APPENDIX 30

Supplementary memorandum submitted by the Office of Science and Technology

BACKGROUND

1. OST's Public Understanding of Science, Engineering and Technology (PUSET) team's current objectives are to:

- demonstrate the relevance of science, engineering and technology (SET) to people's daily lives and its importance to the economy;
- generate interest in SET amongst young people in order to develop and encourage lifelong interest in these subjects and the consideration of science based careers;
- create as many opportunities as possible for people to learn about recent scientific developments and debate their value;
- ensure that there is dialogue between the scientific community and the public, particularly on issues which raise profound ethical and social issues; and
- raise the general level of technical literacy so that the public are in a better position to play a more informed role in this dialogue. Equally important is to enhance the scientific community's understanding of the public's interest in and legitimate concerns about SET.

ANSWERS TO QUESTIONS FROM THE SELECT COMMITTEE

(a) *What are the resources (staff and budget) allocated to the PUSET unit*

OST's Public Understanding of Science, Engineering and Technology (PUSET) team has a staff of two and an annual programme budget of £1.25 million from which it provides grants to a number of organisations and initiatives to support its objectives.

(b) *What contribution the PUSET unit makes to (i) COPUS and (ii) the BA*

(i) COPUS

OST does not make a direct financial contribution to Copus, but OST pays Copus to run a grant scheme on its behalf.

In 2001–02: OST funding to Copus was £272,960 for a small grants scheme to support science communication activities in the UK (this sum includes an allocation of £42,860 for administration of the scheme). Priority was given to grants for dialogue, Science Year and collaborative projects. The three elements of the scheme are:

- Seed grants, up to £3,000.
- Science week grants, up to £3,000.
- Development grants, up to £20,000.

In addition to OST's parliamentary grant in aid to the Royal Society includes provision for the Royal Society's own support for Copus and its grants scheme.

(ii) OST Support for the BA

Within the multiplicity of bodies now involved in public engagement, understanding: awareness and appreciation of science, the British Association (BA) is the only nationwide membership organisation wholly devoted to this area. OST provides funding to provide core support towards the fixed costs of the BA underpinning all aspects of its work, and the central costs for development and delivery of National Science Week.

OST works closely with the BA and has provided it with core support since 1996–97, as well as *ad hoc* support for specific projects and activities. OST provides a significant contribution to the BA's core funding (just under one quarter of its overall income), and support for a number of BA initiatives. OST has now combined the core and *ad hoc* support into a single grant. In 2001–02, OST provided £590,000 funding for the BA. In 2002–03, the OST grant will be £542,000.

(c) *What other projects the unit funds*

Most of these projects came to an end in March 2002. We are not awarding new grants until our internal review has been completed.

1. Scottish Science Trust (1999–2002): £110,000 to contribute to the core funding of the Scottish Science Trust (the over-arching body for public understanding of science, engineering, technology and medicine in

Scotland). The specific aim of the grant is to enable the Trust to assist with the development of an overall operating strategy for revenue funding for Scottish science centres.

2. National Respect Campaign (2000–02): £100,000 for a campaign, run by the African Caribbean Network for Science and Technology, to highlight to black youngsters the educational and career opportunities available in science, engineering and technology. Key features will be a poster campaign using role models, careers information, and a number of national launch events.

3. Y Touring (1999–2002): £285,000 to support Creating the Debate for the New Millennium. This project, supported in partnership with the Wellcome Trust, addresses biomedical issues through theatre and drama. Plays focusing on xenotransplantation, mental health, genetic testing and therapeutic cloning have been performed around the country, with actors stating "in character" after the performance and taking part in a discussion with the audience. Some of the plays have reached a wider audience through television broadcast.

4. Vega Science Trust (1999–2002): core funding of £240,000 to enable Vega to develop into a major force in promoting high quality science broadcasting.

5. Public dialogue (2001–02): £4,700 from OST as a contribution to a joint study with six of the UK Research Councils. This project will provide practical guidelines for developing public dialogue activities.

6. ECSITE-UK (2001–04): £150,000 to the UK science and discovery centre network (hosted by the BA). OST is funding the development of this network, which aims to act as a single point of contact for science centres and facilitate collaboration and effective use of resources.

(d) *Whether it carries out PUS activities directly*

The only activities that the PUSET team carries out directly are events for DTI staff during science week.

June 2002

APPENDIX 31

Memorandum submitted by the Royal Academy of Engineering

THE ROYAL ACADEMY OF ENGINEERING: A BRIEF GUIDE

1. The Royal Academy comprises the UK's most eminent engineers of all disciplines. It seeks to contribute to the public good by promoting excellence in engineering.

2. The Academy's 1,270 Fellows are drawn from all branches of the engineering profession, allowing The Academy to take a uniquely multi-disciplinary approach to modern engineering problems.

3. Save for basic travel expenses, Fellows receive no formal remuneration for their contribution to The Academy's activities. For many Fellows, their involvement with The Academy provides an opportunity to "put something back" for the good of the wider engineering sector.

4. The Academy's activities include substantial financial support for research chairs and fellowships, an extensive education programme, visiting professorships and industrial secondments. It provides expert advice on engineering matters to government and other bodies and awards the UK's premier annual prize for innovation in engineering, the Royal Academy of Engineering MacRobert Award.

5. It has always maintained strong relationships with Parliament through Select Committees, individual Members, the Associate Parliamentary Engineering Group and, prior to its transfer to Parliament, through hosting the Parliamentary Office of Science and Technology (POST).

6. Modern engineering includes much more than the "traditional" engineering disciplines such as mechanical and civil engineering. The Academy's Fellows include experts in software engineering, biomedical engineering, nanotechnology and many other disciplines at the forefront of technological advance. The Fellows, by their leadership in all areas of engineering, are responsible for many of the advances enjoyed by society at large.

SUMMARY

7. The Royal Academy of Engineering comprises the UK's most eminent engineers. They are drawn from all disciplines, from civil and mechanical engineering to software engineering, biomedical engineering and nanotechnology. Wherever possible we bring together engineers from academia and industry to address the engineering issues of the day.

8. Engineering touches every aspect of human activity: work, leisure, health and education. In information technology, medicine and transport (to give just a few examples) engineering advances are making fundamental changes to the way we live our lives.

9. The Academy's priorities include: supporting engineering research and encouraging others to recognise its importance to the national economy; and working more closely with Government and Parliament. An

extensive educational programme, directed at schools and undergraduates, seeks to raise the profile and prestige of engineering as a career.

10. Since its establishment in 1976 The Academy has grown and developed not only in terms of the number of Fellows but also in the scale and diversity of its activities. To reflect its maturity and ability to make a real difference The Academy has now established a "Facing Out" initiative to help the organisation develop into a genuinely outward-facing organisation with a strong public profile.

11. The Academy contributes to a wide range of Government consultations and Select Committee inquiries. We now wish to develop this into a much closer relationship, establishing The Academy as the principal advisers to Government and Parliament on engineering matters.

12. Support for engineering research is central to The Academy's activities. The Academy is now proposing two further research support programmes. First, The Academy would like to create a limited number of fully funded Research Chairs for outstanding individuals. Second, we would like to develop international research exchanges for senior academics.

13. The Academy recognises that it has a responsibility to encourage more women to enter the engineering profession and to pursue the career to the senior levels at which they would become candidates for Fellowship of The Academy. Although there is a great deal of progress to be made, there are encouraging signs in the male-female participation rates for some of our schemes aimed at young engineers.

14. Although Grant-in-Aid of £4.27 million accounts for just 30 per cent of The Academy's total income, it performs a crucial pump-priming role. For every £1 of public money that The Academy disburses, we raise roughly £2 from other sources. Without Grant-in-Aid, The Academy would not have the leverage to attract this further finance from other sources.

CURRENT ACTIVITIES

Policy

15. The Academy has a solid track record of advising Government and Parliament on engineering matters.

16. We contribute to a wide range of Government consultations and Select Committee inquiries. These contributions are based on our own consultation with those Fellows who have relevant expertise. For example, in recent months we have responded to the following consultations:

- Performance and Innovation Unit (PIU) energy review;
- DTLR and House of Commons Procedure Select Committee consultations on new parliamentary procedures for major infrastructure projects; and
- Foresight Directorate's review of the Foresight Programme.

17. We produce reports on issues where our expertise can make a difference.

- Our report on Doctoral Level Research Students in Engineering, published in February 2002, warned that Britain's universities cannot recruit enough high-quality, UK-domiciled engineering research students to drive future innovation.
- Almost all of the recommendations of our report on the safety of ro-ro ferries in 1995 were adopted by Government and, later, by the International Maritime Organisation. As a result, all ro-ro ferries, including those built since 1990, were modified to increase safety for the travelling public.

18. The Academy's secretariat assembles policy positions by a rigorous process of consultation with The Academy's Fellows. Preparation of The Academy's expert advice to Government, Select Committees and other official bodies is compatible with the Government guidelines on the provision of scientific advice. The Academy also has its own guidelines for internal use.

UK Focus for Biomedical Engineering

19. The Academy runs the UK Focus for Biomedical Engineering, which assists developments in policy and co-ordinates activities across this important field. In addition to representatives drawn from several professional engineering institutions active in the biomedical field, the UK Focus Executive Committee includes representation from the Research Councils, industry and the medical world.

Associate Parliamentary Engineering Group (APEG)

20. The Academy provides the secretariat and support for APEG, which holds meetings throughout the year at the House of Commons. APEG acts as a forum for the exchange of ideas between parliamentarians and those involved in the full spectrum of engineering activity.

Education

21. Recruiting more young people into creative and innovative engineering is crucial for Britain's future economic success. Unless we are successful in encouraging more young people to take science and mathematics at "A" Level, to read engineering as undergraduates and to stay in engineering at postgraduate and professional levels, then we will have fewer people to develop the innovations of the future.

22. To this end, The Academy undertakes a wide range of educational activities at every level from secondary school to university.

23. The BEST programme, partly funded by the Gatsby Foundation, covers a number of schemes from the age of 13 to Chartered Engineer status.

Secondary

24. The schemes include:

- the Smallpeice Engineering Experience scheme for Year nine pupils (age 13–14) and the Smallpeice Engineering Skills and Careers scheme for Year 10 (age 14–15);
- the Engineering Education Scheme (EES), which involves sixth-formers in tackling a real-life engineering project with a local employer;
- Headstart, which enables sixth-formers to spend four days at a university engineering faculty. 800 students took part at 20 universities in 2001; and
- Year in Industry, which enables high-calibre students to gain experience through top-quality work placements.

Undergraduate

25. The BEST undergraduate programme enhances undergraduates' development and helps to encourage them towards a career in engineering and industry:

- Engineering Leadership Awards offer a range of training, personal development and high-quality vacation work. Around 30 students are selected each year.

Postgraduate

26. The Academy runs a number of schemes for postgraduates:

- Up to 15 highly motivated Chartered Engineers are funded each year for full-time MBAs at business schools abroad through the Sainsbury Management Fellowships in Engineering.
- 65 industrial engineers received grants towards the cost of part-time study courses relating to new technology in 2001. These grants are funded by the Panasonic Trust, which is administered by The Academy. All are co-sponsored by their employer. The Academy hopes to increase the number of grants to 100 per year.

International Travel Grants

27. International Travel Grants enable doctoral students, post-doctoral researchers and Chartered Engineers to make study visits overseas. 555 awards were made in 2001, totalling £332,000.

Visiting Professorships

28. Two Visiting Professorship schemes offer a valuable bridge between academic and industrial engineering. The objective is for experienced engineers from industry to help to strengthen the undergraduate engineering syllabus. The Academy aims to act as seed-corn provider, establishing schemes on a self-sustaining basis and then redirecting funds towards new Visiting Professorship initiatives.

- We are now in the twelfth year of our Visiting Professors in Principles of Engineering Design scheme. This currently supports 126 visiting professors in 46 universities.
- Each year The Academy appoints five engineers from industry to be Visiting Professors in Engineering Design for Sustainable Development. This scheme is now in its third year. The Academy aims to raise the total number of appointments to 25 by 2003–04.
- The Academy's Management Plan sets out proposals to establish Visiting Professorships in the Design of Integrated Engineering Systems from 2004–05. Further proposals for the future development of the Visiting Professorship scheme are set out below under "Our Vision for the Academy's Future".

Research

29. The Academy appoints, finances and monitors a wide range of engineering research positions. Although Grant-in-Aid comprises an important element in the funding of these schemes, the Academy is proud of its success in using the Grant-in-Aid as pump-priming finance that serves to attract additional support from industry and other sources.

30. One of The Academy's Personal Research Chairs provides a good example. In addition to £20,000 of Grant-in-Aid, The Academy was also able to secure £40,000 of support for the position from a major industrial company. Once in post, the Professor concerned succeeded in attracting almost £400,000 of additional funding for his team's activities from charitable, business and academic sources. He built up a research team of 22 people

31. Two points emerge from this and many similar cases: first, The Academy is successful in adding value to Grant-in-Aid; and second, although Grant-in-Aid frequently comprises only a modest proportion of the overall spend on a particular position, its pump-priming role is essential—without it, The Academy would not have the leverage to attract further finance from other sources.

Personal Research Chairs and Senior Research Fellowships

32. The Academy regards these as flagship schemes that make a central contribution to the development of engineering knowledge and ideas. The Personal Research Chairs and Senior Research Fellowships bring together a co-sponsor company, a researcher and a higher education institution to enable research to be carried out in a field of particular interest to the company.

33. Seven new Personal Research Chair appointments were made in 2001. The normal term of a Personal Research Chair is five years.

34. Three new Senior Research Fellowships were appointed in 2001, two for two years and one for five years.

35. The combined total of Personal Research Chairs and Senior Research Fellowships will rise to 33 in 2003–04.

Research Chairs in Innovative Manufacturing

36. The Academy and the Engineering and Physical Sciences Research Council (EPSRC) are joint sponsors of these chairs. Two new appointments, both for five years, were made in 2001.

Postdoctoral Research Fellowships

37. The Academy awards five post-doctoral research fellowships each year. The fellowships provide five years of full funding. Demand exceeds fellowships available by a ratio of 20 to one.

38. The scheme provides crucial support for some of Britain's most talented young engineering researchers. The award-holders themselves benefit from association with the Academy's reputation for excellence, which opens doors to further funding and a network of contacts throughout academia and industry.

Engineering Foresight Awards

39. The Engineering Foresight Awards allow academic and industrial researchers to spend time (usually between three and 12 months) in an overseas centre of excellence. In the current year, 13 engineers have taken up secondments under this scheme.

Industrial Secondment Scheme

40. The Industrial Secondment Scheme allows engineering lecturers to strengthen their awareness of the latest industrial techniques by spending time (usually three to six months) on secondment to an industrial company of their choice.

41. The scheme stimulates lecturers to include the latest thinking in their undergraduate course content and invariably leads to further beneficial contacts between company and university.

42. The Academy pays for the cost of employing a replacement lecturer to cover the secondee's teaching duties.

43. The Academy's objective is to increase the annual number of secondments to 25 by 2003–04.

Review and assessment

44. The Academy's mission is to promote excellence in engineering, and this approach suffuses every post or prize awarded by the Academy. The Academy operates rigorous procedures to ensure that its awards are fairly made and carefully monitored.

45. Although the process varies according to the dictates of the particular scheme, common elements include: interview of candidates by Fellows; independent peer review of candidates' proposals; the appointment of Fellows as mentors; in-post monitoring by Fellows; and submission of reports during and at the end of the post.

46. Even in the case of one of The Academy's more modest schemes—the International Travel Grants (which have an average value of just £600 per award), a Fellow with specialist knowledge of the field concerned is assigned to assess each application and award holders are required to submit a report on their return to the UK. The same Fellow who conducted the initial assessment then evaluates the report and a "quality factor" is awarded. This allows The Academy to monitor the quality of the scheme from year to year.

47. The process of selection and assessment is even more rigorous for major positions such as a Personal Research Chairs. When a proposal for a new Chair is received, the response will be led by one of the Academy's four Lead Assessors for Research, who takes expert advice from three independent Fellows. The same individuals would then be involved in the selection procedure for the eventual incumbent. Once an appointment is made, another Fellow would be appointed as mentor on behalf of the Academy. Annual reports and a formal meeting of all interested parties would be required detailing publications made and research findings achieved.

48. These procedures are essential in order to ensure that Grant-in-Aid is distributed with the transparency and openness demanded by the audit requirements of the Office of Science and Technology.

Awards

49. The range of awards and medals funded by The Academy's own investments recognise excellence in engineering. They include the following:

- The Royal Academy of Engineering MacRobert Award is Britain's premier engineering prize, given annually for the most outstanding innovation. The award is of £50,000 plus a gold medal. In 2001, the MacRobert Award went to Sensaura Ltd, for their new three-dimensional audio technology system, which is capable of reproducing sounds all around the listener.
- The Prince Philip Medal is awarded periodically to an engineer of any nationality who has made an exceptional contribution to engineering. In 2001 it was awarded to Philip Ruffles CBE RDI FREng FRS, former Engineering and Technology Director of Rolls-Royce plc, in recognition of his exceptional contribution to engineering and the aero engine industry.
- The Sir Frank Whittle Medal recognises sustained and outstanding engineering achievement that contributes to the well-being of the nation. In 2001, it was awarded to Prof Tim Berners-Lee OBE FREng FRS, for creating the World Wide Web.

50. Each award is judged by an Evaluation Committee of Fellows who are leaders in their fields. Applications are rigorously assessed against a defined set of criteria. For example, in the case of the MacRobert Award, the Committee members look for world-leading engineering developments that demonstrate innovation, successful commercial exploitation and benefit to the community.

51. As with every other Academy scheme, there is completely open competition for The Academy's awards. Each scheme is widely advertised on The Academy's website, in the engineering press and by circulation of publicity material within the industry. The Academy maintains extensive databases for this specific purpose.

52. In the case of the MacRobert Award, the call for entries is circulated to around 7,000 individuals—Fellows, senior industrialists, academics and trade associations.

Events and Publications

Public lectures

53. The Academy organises major public lectures on engineering-related topics of wide interest. These events, which are open to all, typically attract audiences of 2–300, including Fellows, other engineering professionals, media, politicians and other interested individuals:

- Recent lecturers have included: the Transport Commissioner for London, Robert Kiley, on "Engineering London's Future"; Robert Benaim FREng on "Engineering and Architecture", and Professor John Uff QC FREng on "Engineering Ethics: do engineers have a duty to the public?".

Conferences

54. The Academy organises major conferences, such as the annual conference of the UK Focus for Biomedical Engineering. The 2002 Conference, to be held on 29 April, will look at "Technology Transfer in Biomedical Engineering".

Technical briefings

55. The Academy organises a series of Technical Briefing events throughout the year. These are held at The Academy's offices and are open to Fellows and invited guests only. Conducted under Chatham House rules, they allow Fellows to be briefed on the latest developments by industry experts.

- Recent Technical Briefings have looked at: "Learning from Accidents", and "The Future of Motor Transport".

Ingenia

56. The Academy's principal publication is Ingenia, a quarterly magazine. Articles cover a broad range of topics and issues from IT and communications to energy, innovative design, infrastructure, education and training. The publication is aimed at both specialists and non-specialists with an interest in engineering, whether in business, industry, academia, government or media:

- Ingenia is circulated to some 5,500 readers. These include Fellows of The Academy, other senior engineers in industry and academia, MPs and senior civil servants involved in engineering issues. It is also read by those developing and educating engineers—university vice-chancellors and academic staff, and by those in financial and political areas such as bankers, analysts, venture capitalists and policy makers responsible for engineering activities that affect economic growth, social welfare, sustainable development and the environment.

RELATIONSHIP WITH OTHER ENGINEERING ORGANISATIONS

57. Some commentators remain uncertain about how the Royal Academy of Engineering relates to the individual engineering institutions and, in particular, to the new Engineering and Technology Board (ETB). The Academy's role is clear—to promote excellence in engineering. It does so through a Fellowship that comprises the most distinguished engineers in the UK.

58. Unlike the individual engineering institutions, the Royal Academy of Engineering draws its Fellows from across the full range of engineering disciplines, from chemical engineering to biomedical engineering, including software engineering and nanotechnology. We are able to bring a uniquely multidisciplinary approach when commenting on engineering issues, especially when the general public is involved.

The Engineering and Technology Board

59. The ETB has been set up to be the champion of the wider engineering and technology community in the UK, including many who practise engineering outside the organised network of the established engineering institutions.

60. Research conducted by The Academy found that there are at least two million highly skilled people employed in engineering or technological businesses, but only 600,000 belong to the 36 professional engineering institutions. The ETB seeks to represent all two million involved in engineering or technology.

The individual engineering institutions

61. The 36 Engineering Institutions (eg the Institution of Mechanical Engineers, the Institution of Civil Engineers) draw their members from specific branches of engineering. They have regard to their members' personal requirements, for example, in relation to continuing professional development.

62. Most of the senior figures in the major engineering institutions are also Fellows of The Academy.

The network of engineering institutions

63. Dr Robert Hawley FREng (a prime mover in the creation of the ETB) has given what is perhaps the best summary of the roles of the various engineering organisations:

> "The Royal Academy of Engineering is about engineering and engineering excellence.
>
> The engineering institutions are about the needs and development of individual engineers.
>
> The New Regulatory Board is about the setting, auditing and regulating of standards for professional engineers.
>
> And the ETB is about the needs and promotion of the wider engineering and technology community".*

FELLOWS AND COUNCIL

Election of Fellows

64. Existing Fellows propose prospective new Fellows of The Academy. All applications go before a Membership Committee and are then put to a vote at the AGM. All Fellows are entitled to attend and vote at the AGM.

65. Fellows pay an annual subscription of £160. There is also a one-off joining fee of £250.

66. Although The Academy's procedures for electing Fellows and Council are operated in a fair and proper manner, we recognise the importance of making them more transparent. We are working with the Electoral Reform Society to strengthen our procedures for electing Council and Officers.

67. A statistical breakdown of The Academy's Fellows is given at Annex 2.

Women Fellows

68. The Academy is acutely aware of the very low numbers of women in its own ranks and in engineering in general. Of The Academy's 1,270 Fellows, 15 are women. As the Royal Academy of Engineering, we recognise that we have a responsibility to encourage more women into the profession.

69. There is no question of The Academy discriminating against women in the election process. There are simply very few women at senior levels of the engineering profession. The number of senior women in engineering today reflects the low numbers who entered the profession 20 or 30 years ago and higher drop-out rates due to family and other commitments.

70. There are some modest reasons for optimism. Of our 34 Fellows under the age of 50, 20 per cent are women. Although we would like to see this figure higher, it is better than the male-female ratio for undergraduate level engineering courses (14 per cent).

71. Many of our educational schemes are helping to bring women into engineering. Women are much better represented on our schemes than they are in the overall figures for engineering undergraduates. To give some examples:

- Over 5,000 young people take part in our nationwide Best engineering education programme each year. Over 25 per cent are female (almost double the current university entry rate), which bodes well for the future of women in engineering.
- The Academy's Panasonic Trust Fellowship Scheme provides grants of £7,000 each to enable graduate engineers to undertake full-time Masters courses. In 2001, four of the five award-winners were women. Of the 34 original applications, 28 were from men and six from women.
- Of applications for The Academy's International Travel Grant Scheme in 2001, 72 per cent were male and 28 per cent female—double the percentage of women entering university as engineering or technology undergraduates.
- In the latest round of our Post-doctoral Research Fellowships scheme, 20 per cent of applicants were women, but women took two of the five fellowships awarded.

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* Dr Robert Hawley, Sir Henry Royce Memorial Lecture, 31 October 2001.

Ethnic origin of Fellows

72. The Academy does not collect statistics on the ethnic origin of its Fellows. Fellows have to be British citizens, except for those elected as foreign members.

OUR VISION FOR THE ACADEMY'S FUTURE

73. Although widely known and respected at senior levels in the engineering world, The Academy is anxious to make a greater impact on public policy-making and to do more to raise the profile and prestige of engineering as a career.

74. The Academy already has plans to expand a number of its activities under the Management Plan agreed with the Office of Science and Technology for the period up to 2003–04.

75. This section goes beyond the plans already agreed. It sets out some thoughts on how we would like to achieve a step-change in The Academy's activities—and on how we would like Government to help us to make a bigger contribution to the public good. It deliberately takes no account of cost implications. It is intended to demonstrate the extent of The Academy's ambition, rather than the limitations of our revenue stream.

76. Two of these "ideas for the future" (Research Chairs and International Research Exchanges) are briefly outlined in The Academy's Management Plan, with indicative costings for 2004–05 onwards attached. Others are set out for the first time in this evidence.

Leading Advisers to Government and Parliament

A greater impact on public policy-making

77. The Academy has the expertise to make a much greater contribution to public policy-making. In this we seek to emulate the relationship that the National Academy of Engineering in Washington has with Congress and the US Government.

78. Instead of simply responding to consultations and producing our own reports, we would like to work as the Government's principal advisers on engineering matters. The breadth of expertise among The Academy's Fellows means that on almost any engineering issue The Academy can call on national or world experts.

79. We should like to place The Academy at the disposal of Ministers and parliamentarians, with Fellows and staff of The Academy ready to fulfil the following roles:

- Fellows can be made available as specialist advisers to Select Committees or as expert witnesses to appear before Select Committees
- The Government's proposal for new parliamentary procedures for handling major infrastructure projects provides a perfect example of how The Academy can make a contribution. If, as seems reasonably likely, Parliament decides to use a Committee process to scrutinise such projects, The Academy would be ideally placed to provide the technical assistance that Members would find invaluable.
- The Academy can organise and host seminars bringing together experts, civil servants and politicians, under Chatham House rules if necessary. For example, we held a very successful meeting in June 2001 on the Government's early plans for R&D tax credits for larger companies, involving Fellows, officials from HM Treasury, the Inland Revenue and the DTI, tax lawyers and business leaders. We would be pleased to organise many more such occasions—if the Government would find it helpful.
- The Academy can be commissioned to produce reports to Ministers or Government departments on specific engineering topics. For example, The Academy is preparing an engineering critique of the recent PIU report on energy policy for the Energy Minister, Brian Wilson MP. Although The Academy has undertaken projects of this kind from time to time in the past, we have the expertise to tackle more issues (although staffing and financial resources are limited at present).

"Facing Out"

80. Since its establishment in 1976 The Academy has grown and developed not only in terms of the number of Fellows but also in the scale and diversity of its activities. To reflect its maturity and ability to make a real difference The Academy has now established a "Facing Out" initiative to help the organisation develop into a genuinely outward-facing organisation with a strong public profile.

81. "Facing Out" is a logical next step in The Academy's development. It will enable The Academy to generate debate on engineering issues and highlight the economic importance of the sector. The project is being driven by an advisory group of Fellows, journalists and politicians.

82. As a first step, The Academy has established a database of Fellows willing to speak to the media on a range of engineering topics; this will run on the Academy web site, which has itself been extensively modernised to emphasise events of current interest.

83. An Academy Awards event has also been instigated in order to showcase more effectively the achievements of our annual medallists. Presentation of Britain's biggest engineering prize, the £50,000 MacRobert Award, takes place in November and involves the winner in establishing an exhibition at the Science Museum.

Research Chairs

84. The Academy would like to create a limited number of independent and fully funded RAEng Research Chairs for outstanding individuals. Such appointments would be for up to ten years, enabling the individual to concentrate on research with the added attraction of considerable freedom to establish exceptional centres of research excellence. These would complement the Academy's existing programme of research chairs, which are jointly funded by industry.

85. The Academy would look to make 10 appointments over a period of 10 years. This would require an increase in grant-in-aid of £120,000 in 2004–05, rising to £221,000 in 2005–06.

International Research Exchanges

86. The Academy would like to develop international research exchanges for senior academics. Flexible in duration, these would encourage top-level engineering researchers to visit overseas centres of excellence and vice versa, enabling the enhancement of international networks of excellence.

87. The Academy would look to establish the scheme in 2004–05 with 10 awards, and then increase to 30 awards in 2007–08. This would require extra grant-in-aid of £220,000 in 2004–05, rising to £421,000 in 2005–06.

More support for specialist schools

88. Too many young people turn away from academic subjects such as mathematics and physics at an early stage in their school careers. These subjects are fundamental to an engineering education.

89. If we wish to encourage more young people to pursue an engineering career, then we need to tackle these problems in the early years of secondary education.

90. The Academy is particularly looking to support higher quality teaching and teachers and better equipment and facilities, with an emphasis on developing best practice through a network of specialist schools.

91. Together with the Engineering and Marine Training Authority, the Engineering Employers' Federation, the Engineering Council and other bodies, The Academy has agreed to sponsor three specialist schools in engineering (Eckington School, Woodchurch High School and Devonport High School).

92. The Academy would like to step up this important work by supporting more specialist schools. This would require an increase in grant-in-aid.

Engineering Enterprise scholarships

93. The Academy could consider offering a series of scholarships to promote the development of engineers as entrepreneurs. The scholarships could be offered at Masters level.

94. Such a scheme would recognise the crucial importance of engineering to the economy and would send a clear signal that the Government recognises the value to be found in a combination of engineering and business skills.

Next phase of Visiting Professorship scheme

95. The Academy's Visiting Professors are senior industrial engineers who work with universities to develop more practitioner-oriented degree courses. The schemes were first established in response to concerns that many universities were providing courses that placed too great an emphasis on theory, rather than on practical applications of engineering skills and knowledge. (Full details of the VP schemes are given above).

96. The VPs in Principles of Engineering Design Scheme now receives only token cash support from The Academy, with major funding now going to the VP in Engineering Design for Sustainable Development scheme. Although goodwill and enthusiasm is keeping the VPs in Principles of Engineering Design scheme buoyant at present, we cannot expect this situation to continue indefinitely. The current funding model for Higher Education causes a bias towards academic research, in order to achieve good research assessment ratings, and the teaching of practically oriented topics such as design is under continuous financial pressure.

97. The Academy feels that it is essential to inject significant funding back into the VPs in Principles of Engineering Design scheme (which is still the foundation of all Academy programmes in this area), and to maintain a strong level of funding to the Sustainable Development scheme for at least the rest of this decade.

98. Three follow-on developments to bring greater practitioner input into the syllabus are in the planning or conceptual stages:

— a scheme to introduce systems integration into the undergraduate syllabus;

— a scheme to support practitioner input into degree courses for support engineers; and

— an initiative to assist in the roll out of university expertise into the development of manufactured products (through industrial practitioner support to engineering design centres).

99. With greater financial backing, these projects could be operated in parallel with the existing programme.

ANNEX 1: FINANCE

In the financial year 2001–02 The Academy is forecasting to achieve a total income of about £16.0 million. The most significant elements of this income are as follows:

	£'000	*per cent*
Direct Income:		
Grant-in-Aid	4,270	26.7
Gatsby Charitable Foundation	1,304	8.1
Income from investments	429	2.7
Events and facilities hire	244	1.5
Donations and direct sponsorship	218	1.4
Subscriptions	150	0.9
Other direct income	365	2.3
Sub total	6,980	43.6
Third Party Income in Support of:		
Grant-in-Aid funded programmes	6,540	40.9
Gatsby funded programmes	2,276	14.2
Other programmes	208	1.3
Sub total	9,024	56.4
Total income	16,004	100.0

Grant-in-Aid funding is of crucial importance to The Academy. Direct funding accounts for over 25 per cent of total income and, when the third party income (money spent by others as a result of participating in The Academy's activities) to Grant-in-Aid programmes is included, Grant-in-Aid related activities account for nearly 68 per cent of total income. For every £1 of public money that we disburse, we raise roughly £2 from other sources.

The Academy is proud of its record in extracting the maximum possible value from the Grant-in-Aid with which it works. Our success in generating extra resources alongside the Grant-in-Aid demonstrates that the Academy provides good value for the public funding that it receives. It must be doubted whether any alternative approach would allow the Government to secure the same outputs without substantial public expenditure increases.

It must also be acknowledged that the fact that The Academy is seen to run large Grant-in-Aid funded programmes successfully gives it considerable credibility with companies and organisations when they are approached for support for The Academy's programmes with either direct or third party funding.

Monitoring and auditing Grant-in-aid

There are four main mechanisms that control, monitor and audit the expenditure of Grant-in-Aid. They are: internal control procedures; external auditing; reporting to the Office of Science and Technology (OST); and reporting to the National Audit Office.

(i) Internal Controls

The Academy sets a budget for Grant-in-Aid expenditure each year which has been approved by OST. The overall total of Grant-in-Aid is broken down into separate lines of expenditure for each programme. The Academy's Finance Committee then determines the level of delegated powers to be given to programme managers to raise expenditure requests against the elements of Grant-in-Aid for which they are responsible.

In the entire history of The Academy, there has never been a single instance of financial abuse or misdemeanour.

(ii) External Audit

As a registered charity, The Academy is obliged to follow the statement of recommended practice (SORP) issued by the Charity Commission, this sets out the standards which Charities must achieve in their financial reports. The latest statement issued by the Charity Commission is SORP 2000 which The Academy will implement in full in its financial report for the year ended 31 March 2002. The Academy is also required to comply with the financial reporting standards (FRS) issued by the Accounting Standards Board. The latest reporting standard, FRS17 covering the reporting of pension fund liabilities will be introduced in the 2001–02 financial report. The external auditors have never thought it necessary to include a statement in their report qualifying the accounts in any way.

(iii) Office of Science and Technology (OST)

The Academy maintains sound working relationships with OST both at President and senior staff level, in particular it maintains an open dialogue with OST regarding all aspects of the Grant-in-Aid funded programme. Through these channels of communication The Academy is able both to make an input to the development of OST's strategy, and also to formulate proposals for programmes to be placed in the Management Plan to help the strategy to be achieved.

Each year, The Academy submits the Management Plan for consideration by OST, this plan sets out in detail the proposed expenditure of Grant-in-Aid for the following financial year, together with outline proposals for expenditure in the subsequent two or three years. The Management Plan, once agreed, then becomes the budget for the year. At the end of each financial year The Academy submit copies of the audited accounts for the year to OST, plus a detailed statement of actual Grant-in-Aid expenditure on each programme.

(iv) National Audit Office (NAO)

As with any publicly funded organisation, The Academy is subject to scrutiny by the NAO. The usual process by which this occurs is through the NAO's annual audit of the OST appropriation accounts, of which The Academy is one. The last comment made by the NAO on The Academy's accounts, in November 1999, related to a technical accounting issue which was quickly resolved.

Overheads

In financial year 2001–02 the internal costs of The Academy are as follows:

	£'000	*per cent*
Staff costs (inc. salaries, pension and N.I.)	1,514	59.1
Accommodation (inc. rent, rates, utilities and insurance)	701	27.4
Printing, stationery, postage and telephone	96	3.7
General expenses	82	3.2
Legal, professional and audit fees	84	3.3
Building repairs	42	1.6
Depreciation	43	1.7
Total	2,562	100.0

The utilisation of Grant-in-Aid in the same year is:

	£'000	*per cent*
External expenditure on programmes	2,508	58.7
Staff and overhead costs:		
Staff costs of running programmes	807	18.9
Contribution to accommodation costs	477	11.2
Contribution to other overheads	478	11.2
Subtotal	1,762	41.3
Total expenditure	4,270	100.0

From the above information the following may be deduced:

	£'000
Internal costs	2,562
Less: Staff costs of running programmes	(807)
Total overhead costs	1,755
Grant-in-Aid contribution to accommodation costs	477
Grant-in-Aid contribution to other overheads	478
Total Grant-in-Aid contribution to overheads	955

Therefore as a proportion Grant-in-Aid contributes 54 per cent of the overhead costs incurred by The Academy.

ANNEX 2: FELLOWS—STATISTICAL BREAKDOWN BY INSTITUTION

The Academy has 1,270 Fellows. Election to The Academy is by invitation only; up to 60 Fellows are elected each year from nominations made by existing Fellows.

The table below shows the number of Academy Fellows who are Fellows or members of the individual engineering institutions. Note that many Fellows belong to more than one engineering institution.

Number of Academy Fellows by Fellowship or Membership of individual engineering institutions

Institution	*RAEng Fellows*
Institution of Electrical Engineers	317
Institution of Mechanical Engineers	293
Institution of Civil Engineers	265
Institution of Chemical Engineers	121
Royal Aeronautical Society	109
Institute of Physics	98
Institute of Materials	97
Institution of Structural Engineers	94
Royal Institution of Naval Architects	33
Institution of Mining and Metallurgy	30
British Computer Society	28
Institute of Marine Engineering, Science and Technology	26
Institute of Energy	22
Institution of Gas Engineers	14
Chartered Institution of Building Services Engineers	8
Institution of Nuclear Engineers	5
Institute of Acoustics	4
Institute of Measurement and Control	4
Institution of Agricultural Engineers	2
Institute of Nondestructive Testing	2
Institute of Physics and Engineering in Medicine	1

APPENDIX 32

Supplementary memorandum submitted by the Royal Academy of Engineering

1. COST EFFICIENCY OF RESEARCH FELLOWSHIPS ADMINISTERED BY THE ACADEMY

1.1 *Research Chairs and Senior Research Fellowships*

The Academy currently manages 27 Personal Research Chairs and Senior Research Fellowships. Grant-in-aid is used in all cases to seed additional industrial support in the ratio 1 : 2. Additional third party support is also generally forthcoming.

In consequence, the Academy's administrative costs as a percentage of total support for these posts in FY 2001–02 amounted to 1.9 per cent. As a percentage of Grant-in-aid alone the comparable figure was 6.8 per cent.

1.2 *Post Doctoral Research Fellowships*

The Academy's recently established Post Doctoral Research Fellowship scheme had nine incumbents in FY 2001/02. The core costs of all of these were borne fully by Grant-in-aid but in several cases third party support also proved to be forthcoming.

In consequence, the Academy's administrative costs as a percentage of total support for these posts in FY 2001–02 amounted to 3.4 per cent. As a percentage of Grant-in-aid alone the comparable figure was 5.3 per cent.

2. ETHNIC PROFILE AND POLICY

2.1 *Research Chairs and Fellowships*

The Academy does not at present have an ethnic monitoring process for its various research fellowships, selection being based on the sole criterion of excellence in engineering. However, whilst the evidence of existing incumbents reveals wide ethnic diversity The Academy recognises that it needs to understand its obligations better and clarify its policy without delay. To this end the Academy will seek advice from the CRE.

2.2 *Staff*

The Academy's policy on equal opportunities for its staff is set out in its Staff Handbook as follows:

> "It is The Academy's policy to ensure that no job applicant is disadvantaged or receives unfavourable treatment and that all employees have the opportunity of advancement and development, regardless of race, colour, national origin, sex, marital status, disability, religion etc."

As at 8 May 2002, The Academy employed 39 staff of whom six (ie. 15.4 per cent) were members of ethnic minorities, namely:

Middle Eastern	2
Asian	1
Caribbean	1
African	1
Afro-American	1

Of the six staff referred to above, three hold positions of manager or assistant manager grade.

May 2002

APPENDIX 33

Memorandum submitted by the Royal Astronomical Society

1. GENERAL

The Royal Astronomical Society was founded in the year 1820 and received the grant of a Royal Charter in 1831; its aims as stated in the first Byelaw are "the encouragement and promotion of astronomy and geophysics." The Society is a professional and learned Society with an international membership of 3,000. The Society's scientific interests span a range including the solid earth, the solar system, stars, galaxies and cosmology. The two grant awarding Research Councils with which the RAS is connected are the Particle Physics and Astronomy Research Council (PPARC) and the Natural Environment Research Council (NERC).

2. FELLOWSHIP

Any person over the age of 18 may apply for Fellowship, including amateur scientists. Applications may be made in two ways, either sponsored by a Fellow with personal knowledge of the candidate and supported by another Fellow, or through a newly introduced way intended to open up membership, by the candidate making direct application to the Society, providing evidence of their work or interest in astronomy or geophysics. The terms of the Fellowship encourage the participation of younger scientists and currently the Society has 150 young scientists.

3. THE SOCIETY'S CHARTER

The Society receives no direct Government funding. The Society actively fulfils its Charter commitment in a number of ways.

(a) Publications

The Society publishes front-line research papers in two academic journals which enjoy international acclaim. Monthly Notices is the world's leading astronomical journal and Geophysical Journal International for geophysics is the leading European publication on solid earth geophysics. Publication is free of charge to contributing scientists, of whom there were 3,000 in 2001; two thirds of these work overseas. In addition, the Society publishes Astronomy and Geophysics which has broader appeal and carries reports of scientific meetings, papers on current topics, correspondence and book reviews.

(b) Public Understanding of Science

(i) *Education*

The Society promotes the wide appreciation and understanding of astronomy and geophysics both in the classroom and by the general public. Astronomy has a key role in attracting young people into physical science. Recent activities at schools level have included advising on the content of astronomy and geophysics in the National Curriculum, holding teacher training days at a number of venues around the country, running national competitions for school children, publishing information leaflets and a 32-page booklet on Astronomy in the UK, and setting up resource centres for the loan of teaching material. At University level, with commercial and PPARC sponsorship, the Committee has organised annual prizes which are awarded for the best doctoral theses in astronomy and geophysics.

(ii) *Information for the Public and the Media*

The Society has an active programme in the field of education and media information. A Press Officer issues frequent and regular media releases to an international list of recipients on the latest astronomical discoveries and events, special emphasis being placed on British achievements. She also provides a media enquiry service, routinely dealing with many requests per week for assistance and information. She is assisted by second Press Officer (Space Science) financed from an external grant, appointed to extend and develop this service by making expertise in space science available.

The Society maintains an excellent Library which contains material for research in astronomy and geophysics as well as the histories of these sciences and of associated fields such as navigation. The Society aims at a comprehensive collection of the current literature on astronomy and the relevant sections of geophysics. The Library staff respond to scientific and historical enquiries from members and from the public and provide material for a wide variety of publication media. Collections of the Society's instruments are currently on loan to museums, universities and observatories throughout the country.

(iii) *Grants for Astronomy*

The Society has custodianship of various Trust Funds and Bequests, from which it makes grants for Astronomy. It targets especially recipients and activities outside the normal scope of the remit of Research Councils.

4. CONFERENCES AND SCIENTIFIC MEETINGS

The Society holds scientific discussion meetings three times per month (except during the summer), in London which are attended by its members and to which overseas speakers are invited. An annual National Astronomy Meeting is held, normally at a University location and attended by in excess of 300 astronomers; members also participate in similar annual geophysical meetings. Regional astronomy and geophysics meetings are occasionally held at out of London venues. In 2001, the Society sponsored or cosponsored 27 meetings in five cities at which 180 hours of talks were given by 500 lecturers of whom 10 per cent were from overseas. The Society meetings are open to both Fellows and non-Fellows.

The Society also contributes to the annual meetings of the British Association for the Advancement of Science, National Astronomy Week and the Edinburgh Science Festival. The Society is the UK's Adhering body to the International Astronomical Union (IAU). On behalf of the UK the Society organised the 24th General Assembly of the IAU in Manchester in 2000 attracting 2,000 participants from the entire world. The Society has a number of affiliations within the international scientific communities. Five prestigious named lectures recognising the work of eminent Fellows are given each year by invited speakers.

5. Scientific Advice to Parliament and Government

The Society regularly submits evidence to a number of inquiries held by the Government, Parliamentary Committees and other scientific organisations and institutions, on matters concerning the organisation of science and technology, scientific education at all levels, and on the health of fundamental research. Society representatives attend meetings of the Parliamentary scientific committees.

6. Funding

The Society gets no direct Government funding of any kind. The Society has charitable status (in common with many other learned and professional societies) and its headquarters building is in Burlington House (along with several other societies) so to that extent the Society can be said to benefit in financial terms indirectly from its charitable status and its physical location. Since 1834 the Royal Astronomical Society has occupied Government accommodation free of charge, firstly at Somerset House and latterly at Burlington House.

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APPENDIX 34

Memorandum submitted by the Royal Geographical Society (with the Institute of British Geographers (IBG))

Government Funding of the Scientific Learned Societies

1.1 The Royal Geographical Society (with IBG) is the learned society and professional body for the science of geography and geographers. It is a charity and thus exists to support the public. Almost all its activities are available to the public.

1.2 The Society was established in 1830 for "the advancement of geographical science". The Society has six strategic aims;

- stimulate and support geographical research in the UK and overseas;
- promote and strengthen the value of geography in formal education and life long learning;
- acquire, hold and disseminate geographical information;
- encourage a wider public interest, understanding and enjoyment of geography;
- advise governments and other agencies on geographical issues;
- ensure the continuing vigour of the Society and its Fellowship.

1.3 Geography is the integrated study of the earth's landscapes, environments and societies, set within the context of places and regions. It provides the much-needed capacity to understand the interactions between society and environment.

1.4 The fourth and fifth strategic aims include the communication of geographical science to the public and the provision of geographical advice to government.

1.5 In general, the Society supports over 20 research groups at the forefront of generating new knowledge; promotes geography within the National Curriculum; produces scholarly publications; provides training, including continuing professional development; offers a professional "chartered status" recognition; empowers scholars, young people and teachers through grant giving; presents a "public understanding" national lecture series; provides fora for discussion, and dissemination via its conference programmes and briefing papers; has a significant advisory role; and provides information through its large map collection, library, and picture library.

1.6 The Royal Geographical Society (with IBG) achieves this with no financial support from government. The turnover of approximately £3,000,000 required to support its core charitable activities is raised each year from a combination of sources. These include members' subscriptions, enterprise activities, corporate support, publishing and conference income, and small returns on investments.

1.7 The Society is highly active and has a strategy for further development. It would greatly welcome a more equitable distribution of government funds to learned societies, recognising the public and government benefit that comes from the learned societies as a whole rather than the benefits that accrue from just one or two of them.

1.8 In relation to providing scientific advice and in communicating science to the public, the Society delivered the following activities in the year 2001:

1.8.1 Organised over 160 events in London and the regions, including:

- lectures directly communicating to the public;
- conferences for dissemination and discussion of developments in geography and geographical issues relevant to policy; and

— continuing professional development activities to improve the ability of teachers to disseminate up to date information more effectively.

1.8.2 Responsed to 29 calls for evidence and consultations on matters of education and research. Most consultations involved providing advice to various Government departments and agencies, including the Department for Education and Skills, Quality Assurance Agency, Teacher Training Agency, Becta, Qualifications and Curriculum Authority, ESRC, NERC, English Nature, Office of Science & Technology, and the Institute of Learning & Teaching.

1.8.3 Facilitated the annual geographers' conference, part of which communicated geographical research and issues to the public, producing 48 stories in the national press in four days, and a wide range of other media output including radio and television.

1.8.4 Held a series of key evening discussions bringing together senior players in policy, NGOs, government, research and business and industry as part of the Society's "Environment and Society Forum". This contributes insight to social, economic and environmental challenges facing Britain and the world, and facilitates dialogue and networking. Several government departments and agencies have been closely involved in these events, including DfES, DfID, DLTR, and QCA. Summary statements are widely distributed after the event. Recent topics (2000–01) have included flooding, air transport, rural land use, regenerating Britain's coalfields, managing water resources, tourism and sustainable waste management.

1.8.5 The Society's extensive map resources, originally opened to the public by means of government funding in 1859, assisted the Defence Geographical Information Agency and the US Corps of Engineers on matters relating to Afghanistan, in addition to other "regular" enquiries from the Foreign Office. Sadly this annual grant of £54,000, that was designed primarily to provide access for the general public to these scientific resources and information, was withdrawn in the year 2000. The library, manuscript and picture resources were also widely used in scientific publishing.

1.8.6 Established funding for three major projects to improve communication of information to the public. This includes an internet information and resources project "Geography in the news" (£150,000); a Lottery Funded project to "Unlock the Society's Archives" by improving public access on site and on the internet (£6.7 million), and refurbishing the Society's lecture theatre (£1.7 million).

1.8.7 The Society acted as the UK national body for the International Geographical Union, having taken over this responsibility from the Royal Society in the year 2000.

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APPENDIX 35

Memorandum submitted by the Royal Institution of Great Britain

Further to your invitation of 13 February 2002, the Royal Institution (Ri) is grateful for the opportunity to contribute to the inquiry and would like to make the following comments. The statement first outlines Ri activities, and then describes its main areas of interaction with the Royal Society (RS).

1. Royal Institution Activities

(a) *General funding*

The Ri does not receive any direct government funding for its activities: they are underpinned predominantly by investment income, charitable donations and sponsorship.

(b) *Science communication*

The Ri was inaugurated over 200 years ago to "diffuse science for the common purposes of life". Past perceptions of the Ri as an elitist club has impeded its potential to communicate science. However, over the last three years the Ri has reinterpreted its initial vision to meet the challenges of the 21st Century as witnessed by: an increased number of, and attendance at, events; increased membership; a strong web presence; improvements in promotional material; and the development of the Science Media Centre. A copy of the Spring 2002 Programme is enclosed for your information to show the range and scope of the current activities. Approximately 20,000 people per annum attend these events. Feedback forms at events indicate that the vast majority of the audience attending events are not experts in the field under discussion. See also www.rigb.org.

(c) *Young Persons' Programme*

The Ri provides an extensive Young Persons Programme (YPP), which includes the Maths Master Classes (both Primary and Secondary streams), Events for Schools (schools lectures for Primary, Secondary and post-16 years) and the Christmas Lectures. Over 43,000 young people per annum attend these events. Copies of the Spring YPP programme of events are enclosed for your information. See also www.ri.ac.uk/insideout.

The Events for Schools component is partly funded by a grant from the Royal Society (£94,000 per annum), which the Ri understands comes from the Society's OST allocation. The grant represents a fifth of the overall YPP budget and the main bulk of the programme's expenditure is underpinned predominantly by investment income, charitable donations and sponsorship.

(d) *Science research*

The Davy Faraday Research Laboratory at the Ri—the oldest continuously operating research laboratory in the world—undertakes a wide ranging programme of research into new materials with tailored applications in catalysis, electronics and energy technologies. Jointly with the Department of Chemistry at University College London, it was awarded a 5* grade in the recent Research Assessment Exercise. It receives funding through HEFCE, grants from EPSRC and the EEU, private research contracts and endowment income. The Ri general revenue budget underwrites any shortfall in DFRL activities.

(e) *Heritage and arts-science programmes*

The Ri houses a museum, an extensive archive and possesses a collection of science equipment, artefacts and pictures of national significance. The Museum is open to the public but much of the collections are inaccessible except under supervised conditions. A major HLF bid is being prepared coupled with a partnership fund raising initiative to address these constraints.

1. THE ROYAL INSTITUTION AND THE ROYAL SOCIETY

(a) *Events for Schools*

As stated above, the Events for Schools programme is partly funded by the RS. We acknowledge the financial support of the RS on all the promotional material. The RS is aware that we would like to expand this programme, and that we hope their commitment could extend beyond a purely financial basis to a relationship involving continual professional support from their educational team.

The RS are well disposed to this suggestion and discussions are therefore underway for a joint development and significant expansion of the programme. The nature of the expansion has yet to be discussed fully, but we would assume that to realise the full potential of the project, the Ri and RS would need to make a bid for a larger contribution from the OST science communication budget.

A drawback of the current system is the constraint against long-term planning and stability of the scheme, placed by the annual requirement of applying de novo for funds. We would welcome a more secure funding arrangement in place for such an important and well-established activity. Our ideal scenario would be to have a commitment from the RS to provide funds for a five- or even 10-year period. If this were unacceptable to the RS, the feasibility of a direct payment to the Ri could be explored.

(b) *General science communication*

Science is now communicated UK-wide in many cities, by many different organisations, using a wide range of formats: hands-on exhibits at science centres and museums, national festivals, evening events for the public and public consultation exercises. Clearly, no single organisation could have a monopoly on science communication in these various forms, and nor would they want to. However, more extensive co-ordination could maximise benefits not just to the science communication organisations themselves, but to the nation at large.

This co-ordination could take the form of an annual or twice yearly forum of the science communication organisations to exchange information and ideas, and discuss activity and strategies; and/or funds invested in a website acting as a bulletin board.

It is not immediately obvious what the most cost-effective way would be to achieve the degree of co-ordination required. Since it is already in place, COPUS could take up this challenge, but alternative ideas should also be explored.

(c) *Note*

The Ri is not in a position to comment upon whether the funds given to the RS or the Royal Academy of Engineering represent good value for money.

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APPENDIX 36

Memorandum submitted by the Royal Irish Academy

1. Election to membership of the Academy is a mark of high academic distinction. The Royal Irish Academy draws its membership from the whole island of Ireland. Forty- nine of the 309 members, 28 of whom are scientists or technologists (see Annex I), are currently based in Northern Ireland. The Treasurer and one of the four Vice-Presidents work in Northern Ireland. Five of the 12 new members elected in 2002 work in universities in Northern Ireland.

2. The Academy seeks to promote advanced research and public understanding of it. To this end it works through a network of National Committees and Commissions (which automatically include NI representatives—see Annex II) to promote specialist activities in many areas of science and technology. A range of awards and commemorative prizes has been instituted to motivate talented young scientists to fulfil their potential. We have also initiated a new series of lectures to be delivered by leading international scholars. Northern Ireland is well represented among the award recipients and conference participants.

3. The Academy supports scientific research through its publications, its special research projects and its academic exchanges with other European academies and research institutions. The Proceedings of the Royal Irish Academy focus mainly on the sciences. They are divided into three distinct periodicals: Section A—Mathematical Proceedings, Section B—Biology and Environment and Section C—Archaeology and History. The Academy also publishes the Irish Journal of Earth Sciences. Monographs such as Irish Innovators in Science and Technology (2002) are aimed at the general public. Special research projects include The Genetic Anthropology of Ireland; one of its four pilot studies is based at Queen's University Belfast. The Academy's many biological and environmental studies inevitably concern the entire island of Ireland. Finally, many of the scientific exchange schemes and fellowships are available and regularly awarded to scientists or technologists working in Northern Ireland.

4. The Academy's main source of income is an annual grant of €2.7 million from the Higher Education Authority in the Republic of Ireland. No contribution is made from the equivalent NI body. The Academy employs 40 permanent and 25 contract staff.

5. The Royal Irish Academy has just completed a Strategic Review—a careful evaluation of its statutes, procedures and activities aimed at ensuring that it can pursue its responsibilities in a manner appropriate to the third century of its existence. It is particularly concerned to include in its membership the most talented and productive scholars, irrespective of research area, age, gender or geographical origin. Following extensive consultation with members and with sister academies, it has reaffirmed its mission as, *inter alia*:

- promoting scholarship and research;
- contributing to public policy on scientific research;
- contributing to public debate on issues of concern in science;
- enhancing public awareness of the value and relevance of advanced scientific research;
- conducting its own research projects, especially in areas relating to Ireland and its heritage.

6. The Academy has a valuable role as a major independent instrument for clarifying significant issues facing Irish society, north and south.

7. The Royal Irish Academy is unquestionably relevant to this Inquiry, even though no UK government funding is currently devoted to its support.

As the only Academy for the Sciences and Humanities based in Ireland and operating throughout the island, it is appropriate that the Royal Irish Academy should be funded by governments in both jurisdictions. The Academy wishes to enhance its role in Northern Ireland and to be of greater service to the Northern Ireland Executive and Northern Ireland society. However, its effectiveness in this respect is likely to be limited by resource considerations. We would like to draw this fact to the attention of the House of Commons Inquiry, whose members may wish to consider whether and at what level they would wish to see the work of this learned society supported within Northern Ireland.

April 2002

Annex

SCIENCE MEMBERS OF THE ROYAL IRISH ACADEMY FROM NORTHERN IRELAND

Professor Ingrid Allen—Neuropathologist

Professor Michael Baillie—Palaeoecologist

Professor Brian Bates—Astrophysicist

Professor Kenneth Lloyd—Physicist

Professor Ronald Buchanan—Geographer

Professor Philip Burke—Physicist
Professor Duncan Thorburn Burns—Analytical Chemist
Sir Bernard Crossland—Mechanical Engineer
Professor Derrick Crothers—Physicist
Professor Amilra de Silva—Chemist
Professor James Fairley—Zoologist
Sir Peter Froggatt—Geneticist
Professor Henry Gilbody—Physicist
Professor David Halton—Parasitologist
Professor Alan Hibbert—Mathematician
Professor W. Irwin—Computer Scientist
Professor Arthur Kingston—Physicist
Professor John McCanny—Electronic Engineer
Professor Gerry McKenna—Geneticist
Professor Michael McKervey—Chemist
Professor Benjamin Moiseiwitsch—Mathematician
Professor Jane Nelson—Chemist
Professor Bertus Rima—Molecular Biology
Professor John Rooney—Chemist
Professor F.J. Smith—Computer Scientist
Professor James Stewart—Electrical Engineer
Professor Sean Strain—Nutritional Scientist
Professor David Walmsley—Physicist
Mr Richard Warner—Ethnographer
Professor William Watts—Chemist

Representatives from Northern Ireland on Academy Science Committees

Dr R. Bishop (UU) is Chairman of the National Commission for Microbiology.

Dr C. Thomas (UU) is Chairman of the National Committee for Geography.

Professor F.J. Smith, MRIA (QUB) is Chairman of the National Committee for Engineering Sciences.

Dr Alun Evans (QUB) is Secretary of the Advisory Committee on Genetic Anthropology.

Professor K. Houston (UU) is Chairman of the National Sub-Commission for Mathematical Instruction.

Professor J.A.C. Stewart MRIA (QUB) is Chairman of URSI Subcommittee (International Union of Radio Science).

Dr M. Keane (St Mary's College, Belfast) is chairperson of the National Commission for the Teaching of Geography.

Professor M.E. Bailey (Armagh Observatory) and Dr A. Fitzsimons (QUB) are members of the National Committee for Astronomy and Space Research.

Professor R.J.H. Davies (QUB) Professor B. Hannigan (UU) and Dr D. Hanna (Industrial Research and Technology Unit) are members of the National Committee for Biochemistry.

Dr R.N. Govier (QUB) and Dr T.E. Andrew (UU) are members of the National Committee for Biology

Mr G. Hughes (UU), Dr A. Cook (UU) are members of the National Commission for the Teaching of Biology.

Mr John Quinn (QUB) and Dr A. McHale (UU) are members of the National Commission for Microbiology.

Dr H. Platt (Environment and Heritage Service), Professor R.B. Wood and Professor A. Ferguson (QUB) are members of the National Commission for Hydrobiology.

Dr J.F. Malone (QUB) is a member of the National Committee for Chemistry.

Professor B. Norton (UU) and Professor J.A.C. Stewart (QUB) are members of the National Committee for Engineering Sciences.

Dr Noel Evans (UU), Professor V. Fusco (QUB), Mr A.D. Patterson are members of URSI.

Mr Donald Campbell (Met Office NI), Dr J. McCloskey (UU) and Mr J.R.P. Bennett (Lisburn) are members of the National Committee for Geodesy and Geophysics.

Professor D.N.Livingstone (QUB) and Mr R. Clements (Ordnance Survey NI) are members of the National Committee for Geography.

Mr A. Rodgers (Royal College, Armagh), Ms A.M. Duffy (Belfast), Mr R. O'Neill (Bessbrook), Mr G. Kelly (Belfast), Mrs P. Wyness (Hunterhouse College) and Ms Marianne Lawlor (Downpatrick) are members of the National Commission for the Teaching of Geography.

Dr A. Ruffell (QUB), Mr J.W. Arthurs (Geological Survey of NI) and Dr P. Lyle (UU) are members of the National Committee for Geology.

Professor A.W. Wickstead and Professor S.K. Houston are members of the National Committee for Maths and the National Commission for Mathematical Instruction.

Professor J. Pearce (QUB) and Dr B. Livingstone (UU) are members of the National Committee for Nutritional Sciences.

Professor J. McMullan (UU) and Professor D.G. Walmsley (QUB) are members of the National Committee for Physics.

Mr Ian Headden (Ballymena Academy) and Dr Jason Greenwood (QUB) are members of the National Commission for the Teaching of Physics.

Professor I. Mongomery (QUB) is one of the two editors of the Proceedings of the Royal Irish Academy Section B: Biology and Environment.

Dr C. Gibson of the Department of Agriculture and Rural Development (NI) and Dr C. Maggs of the Queen's University of Belfast are members of the editorial board of Section B.

Professor D.H. Armitage is a member of the Editorial Board of the Proceedings of the Royal Irish Academy Section A: Mathematical Proceedings.

Dr A. Ruffell of the Queen's University of Belfast is a member of the Editorial Board of the Irish Journal of Earth Sciences.

APPENDIX 37

Memorandum submitted by the Royal Society

SUMMARY

1. The UK is one of the world's leading scientific nations and the Royal Society is recognised as the world's leading academy of science, having supported science continuously for longer than any other academy in the world. Our mission is the pursuit of excellence in science by encouraging and supporting the best individual scientists to practise and communicate and by providing the highest quality independent science advice. We do this to push back the frontiers of knowledge, to improve the quality of life both nationally and internationally and to improve the UK's competitive position. Our remit encompasses all of science and technology including medical and engineering sciences. The Royal Society performs three roles: as a learned society, as an academy and as a funding agency.

2. Our largest programme, which includes research fellowships and professorships, is designed to strengthen UK science by developing individual talent. These schemes fund over 400 of the UK's best scientists and engineers to undertake cutting edge research. The university research fellowships (URFs) enable 322 of the best postdoctoral researchers to spend up to 10 years on exciting research areas. The Dorothy Hodgkin scheme supports 55 scientists and is unique in providing flexible funding at the early stages of postdoctoral careers when researchers, particularly women, tend to leave science. The industrial fellowships encourage industry/academic collaboration and our most senior awards (Royal Society professorships) allow UK universities to compete with industry and overseas universities for the world's leading scientists.

3. The vitality of the UK's science base is dependent on attracting and retaining the best scientists. The extra money of the new Wolfson/OST Research Merit Awards has enabled us to attract researchers from universities such as Princeton and California to the UK and approximately 30 per cent of the URFs return from abroad to take up their posts. We have increased the opportunities for the best and brightest postdoctoral scientists in USA to come to the UK by establishing a new fellowship scheme and we hope to extend this to other countries of scientific strength with additional government funding.

4. The Society plays a vital role in ensuring that the UK engages with the best science around the world. We support excellence in science internationally through the provision of a range of grants and fellowships that enable high calibre scientists to move to and from the United Kingdom to initiate collaboration, access unique sites or facilities, exchange ideas, gain new skills or link centres of excellence for scientific research. We represent UK scientists on a wide range of European and international bodies, taking a leading role in a number of international programmes.

5. The selection procedure for research fellowships and grants is based on rigorous peer review by international referees and panels of leading experts in their fields with both Fellows and non-Fellows involved in this process. Funds are allocated on the basis of scientific excellence irrespective of discipline and are not constrained by the subject-specific priorities of the research councils. Our remit encompasses the whole range of science, engineering and technology allowing us to fund the type of interdisciplinary research projects that frequently fall between the remits of the individual funding bodies.

6. Acting as a focal point for the presentation of the latest research results has always been central to the Society's work and our international discussion meetings, journals and specialist lecture series provide the world's top scientists with many opportunities to contribute to the advancement of knowledge.

7. We fully recognise the importance of communicating with the public whose attitudes and values are influential in the progress of science. Through a new, privately funded, Science in Society programme we are providing innovative and effective ways for scientists and policy makers to engage with the public. Recent activities have included a national forum for science, a series of public dialogue meetings throughout the UK and the creation of a dedicated website with an online dialogue facility. This is in addition to a diverse programme of lectures, exhibitions and debates targeted at a public audience.

8. Today's school pupils are the scientists and engineers of tomorrow. Too few young people are receiving a proper grounding in science and mathematics and we are trying to tackle this problem in a number of ways. We influence the content and delivery of the curriculum by contributing to the formulation of national education policy through representatives on government working groups and influential reports on subjects such as school science technicians and the teaching of geometry. We also work to highlight the many achievements of UK scientists and engineers and to create opportunities for schools to collaborate with universities and industry.

9. Many areas of public policy have a scientific dimension and policy-makers need access to reliable advice about the science. It is vital that policy-makers make use of advice from independent, authoritative and credible organisations outside government. Providing such advice is a high profile and influential element of the Society's work, and accounts for much of the Society's visibility beyond the professional scientific community. Last year, for example, we produced major reports on such subjects as genetically modified foods, climate change and depleted uranium, all with direct implications for policy. We are currently undertaking an inquiry into infectious diseases in livestock (including foot and mouth) on behalf of government. Our advice work is openly published, and we consult widely to ensure that we take account of all relevant information.

10. The Society works closely with a range of other bodies in UK including the British Association and the Royal Institution and together we formed COPUS. All receive money from the Society's PGA. We support the Foundation for Science and Technology and the R&D Society from private funds and work with the Association for Science Education. We have close links with the British Academy, the Royal Academy of Engineering and the Academy of Medical Sciences. We also cooperate with learned societies both directly and through the Science Council and maintain close links with the research councils. The Society represents the UK on many European and international bodies and has formal agreements with over 50 scientific organisations overseas.

11. The number of women in senior scientific, engineering and technological positions in the UK is unsatisfactory and represents a clear challenge to the Society's stated objective of ensuring the supply of the very best scientific talent. We have developed a broad range of activities (funded from both the PGA and private funds) aimed at tackling this problem. In 1995 we established the Dorothy Hodgkin fellowship scheme, which offers flexible working conditions and a mentor to research fellows at the early stages of their careers when women are most likely to leave science. Other activities include: the promotion of successful women as role models; ensuring that women are represented in our activities (including strategy and policy making, research appointments and selection of new Fellows); providing a contribution to child care in our conference grants. We also work closely with organisations such as WISE and the Athena project to promote the interests of women in science.

12. As a national academy, the Society's activities and funding are spread throughout the UK. Our Fellows are in 46 universities and numerous other bodies; and our researchers hold posts at 47 institutions. We hold well-attended public meetings and scientific lectures in major cities across the UK and are making increasing use of the web (with over two million hits per month on our web site) so that anybody, regardless of where they are based, can access information about our activities and give us feedback. But the Society is seeking to focus even more attention on the many regions of the UK and has submitted a bid through the spending review to support an enhanced programme of activities.

13. The Society's excellent reputation in the UK and throughout the world is based on the scientific credentials and achievements of its Fellows (FRS), who are elected for life. Fellows contribute enormously, free of charge, to our activities and pay an annual subscription. The election process for the Fellowship is based on rigorous peer review and we are constantly seeking ways to make this process as transparent and fair as possible. We have recently broadened and simplified the criteria for nomination to attract a higher number of women and candidates from emerging disciplines or bodies where there are relatively few Fellows. Women are still under-represented in senior scientific posts in universities and industry, and this is inevitably reflected in the disappointingly small number of female Fellows of the Society. The Royal Society does not

monitor for ethnicity, but as we elect from throughout the Commonwealth, as well as having Foreign Members, our Fellowship draws from a diverse ethnic base.

14. The Royal Society is an independent, self-governing body, established under Royal Charter and managing its own affairs under the terms of that Charter and the requirements of charity law. It is thus independent of government. It receives money from the government through the science budget. Almost all of this is given out directly in support of UK science for the purposes agreed with the Office of Science and Technology (OST). The only public money going to the Society for its own use is the sum needed to pay the rent of the premises, in an agreement dating back to the eighteenth century.

15. Of the Society's total expenditure for 2001–02 of £39.1 million, 66 per cent or £25.9 million of the total was met from the Parliamentary Grant in Aid (PGA) allocated through the Office of Science and Technology (OST). The remaining expenditure was supported from private sources or from income generated mainly from our endowment and publications activities. The percentage of the Society's total funding met by the PGA has fallen from 78 per cent in 1996 to 66 per cent in 2001. The PGA income allows the Society to raise additional funding, much of it new, to support UK science. The Wolfson/OST Research Merit Award scheme is such an example where £2 million allocated from the PGA has attracted an additional £2 million of private funding which would not have been donated had the public funding not been available.

16. The PGA is monitored by the OST on a quarterly basis, with an annual report and audited accounts produced for OST. The Society has an Accounting Officer (the Executive Secretary) and is subject to the same monitoring of expenditure and compliance with expenditure rules as any other publicly funded body. The Society continues to reduce the proportion of the PGA allocated for administration, from 9 per cent in 1998 to just under 6 per cent in 2001.

17. The Society's premises, leased from the Crown Estate, are a home for UK science and the whole scientific community and in 2001–02 hosted over 1800 meetings.

18. The Society's priorities for the future are underpinned by our policy of strengthening the science base through developing young talent, retaining the brightest and best in the UK and ensuring the UK is internationally competitive. Our bid to OST for the next spending review includes proposals to: increase opportunities for women to remain in science; promote exchange between industry and academia; attract the brightest young postdoctoral scientists from countries of scientific strength to the UK; and strengthen our science policy activities in the European arena. We also believe there is a need to increase the numbers of URFs and DHFs in posts in UK universities.

19. In conclusion the Royal Society makes a substantial contribution to keeping UK science competitive with the best in the world. Our unique attributes include the Fellowship of 1,200 of the most outstanding scientists in the UK and the Commonwealth, the extensive network of younger scientists who hold our awards and are connected with the Society in other ways, our focus on supporting scientific excellence irrespective of discipline, and our independence of government and vested interest. We use these attributes in imaginative and creative ways to promote science. The money we receive through OST constitutes just 1.6 per cent of the science budget, but it has a powerful catalytic impact on UK science as a whole. Coupled with our private sources of income and the flexibility we have in deploying them, it enables us to anticipate and respond to the needs of UK science and thus to promote the well-being of the UK.

1. Background

The Royal Society is the UK's independent academy of science. It was founded in 1660 with the purpose of improving what we would now call "science". The early Fellows, who included Christopher Wren, Robert Boyle, John Evelyn, Robert Hooke and Edmund Halley were intent on developing a new more rational way of viewing the world based on observable phenomena and on experimentation and not based on opinion, superstition or chance. The vision of the founders and their work which is carried on by today's Fellows is recognised by scientific communities throughout the world as being substantially responsible for establishing science as a major British and global endeavour. Although there were attempts to create academies in other countries before the Royal Society, we are the only one with an unbroken history, making us the world's oldest academy in continuous existence.

Today, the Royal Society's mission is the pursuit of excellence in science by supporting and encouraging the best individual scientists to practise and communicate their science. The Society does this to push back the frontiers of knowledge and to improve the quality of life in Britain and globally. We define science as mathematical, physical, chemical. biological, engineering, medical and agricultural sciences and technology. We do not cover the humanities or the social sciences; these are the responsibility of the British Academy which the Royal Society helped to found in 1901. The Royal Society also supported the founding of the Royal Academy of Engineering (1976) and the Academy of Medical Sciences (1999) recognising that the professions of engineering and clinical medicine did not have a single voice for their members. The Society does, however, continue to elect engineers and medical scientists and provide financial support to both fields as part of its remit.

The Society has three major roles: as a learned society organising meetings, producing publications, recognising excellence and generally promoting science; as the UK's Academy of Science providing independent science advice and representing UK scientists on the international stage; and as a funding agency providing financial support for scientists, engineers and technologists to pursue their work. Working across the whole range of science, engineering and technology (SET), the Society's programmes are designed to:

— strengthen the UK science base by developing young talent in Britain, ensuring the UK is internationally competitive and providing direct support for cutting edge science;

— support education and communication and encourage dialogue with the public;

— provide the best independent advice nationally and internationally;

— promote scholarship.

2. STRENGTHENING THE UK SCIENCE BASE BY DEVELOPING INDIVIDUAL TALENT

Supporting the outstanding individual is the Society's highest funding priority. Our prestigious research fellowship schemes support over 400 scientists and engineers ranging from the junior postdoctoral level to research professors. They account for just under two thirds of our PGA budget and almost a quarter of our non-PGA budget (see Appendix 1 for details of our schemes and Appendix 8 for the finance). This funding makes a major contribution to maintaining and strengthening the UK science base by developing young talent, by attracting excellent scientists to the UK and by retaining those already here.

2.1 *Developing future scientific leaders*

One of our key strengths is the ability to identify future scientific world leaders and to provide them with the support required to fulfil this potential. Approximately half of the total PGA budget is spent on university research fellows (URFs) and Dorothy Hodgkin research fellows (DHFs), who are on average aged 31 and 29 respectively when appointed. We ensure that our research fellows are relieved of heavy teaching and administration duties so that they can concentrate on their research. The URF scheme is our largest and enables 322 of the best postdoctoral researchers to devote up to 10 years on exciting research areas, a longer period of support than is provided by other UK schemes. The Dorothy Hodgkin scheme is also unique both in providing flexible funding for 55 people at the early stages of their postdoctoral careers when many academics (particularly women) leave science.

Both schemes provide award holders with access to a level of support and experience that are crucial to the personal and professional development of tomorrow's scientific leaders. Experienced staff provide advice to individuals throughout their award and assist award holders in discussions with universities about their progression to senior posts. Seminars provide new research fellows with the opportunity to meet their peers and gain advice on funding and career opportunities. In addition to media and communication skills courses, our privately funded press office provides the additional advice and resources to award holders wanting to promote their research. We have recently introduced an MP pairing scheme and short secondments into government. As the national academy the Royal Society has a diverse portfolio of activities, often privately funded. Participation by research fellows in activities such as science advice working groups, Science in Society public dialogue events and the development of educational resources provides them with valuable experience. Research fellows who reach the end of their awards retain their link with the Society through membership of the Alumnus group, a national network of scientists (from both academia and industry) who meet annually to discuss issues of contemporary scientific importance. This portfolio of support and activities is not provided by other UK fellowship schemes.

2.2 *Attracting and retaining the best scientists*

The fellowship schemes play a key role in attracting excellent scientists to the UK and by retaining those already here. The new Wolfson/OST research merit award scheme was established to enable UK universities to compete with industry and overseas universities for outstanding talent from around the world by providing competitive salaries and research expenses. The scheme has resulted in researchers like Dr Gabriel Aeppli leaving Princeton University in the US to work on quantum physics at University College London. Research professorships, our most prestigious awards, have been attracting and retaining the world's best scientists since the 1920's. The excellence of these award holders is reflected by the number of prizes they are awarded. Seven of our research professors have been Nobel laureates; others have been awarded equally prestigious prizes including the Fields medal (for maths) and the Craaford prize (for ecology). At the more junior level, approximately 30 per cent of the holders of URFs (our largest scheme) return from abroad to take up their awards.

2.3 *Promoting interdisciplinary science*

The research councils direct a considerable portion of their funding into specific areas of science (known as thematic programmes). In contrast we allocate funding on the basis of scientific excellence and potential irrespective of discipline. This responsive mode funding enables us to support the type of innovative and blue skies research that is so vital to maintaining and developing the strength and diversity of the UK science base.

Our remit encompasses the whole range of the natural sciences (including maths and computing), engineering and technology disciplines allowing us to fund the type of interdisciplinary research projects that frequently fall between the remits of the individual funding bodies.

2.4 *Benefit to the UK economy*

The recent evaluation of our industry fellowship scheme (see Appendix 2) has showed its success in promoting substantial collaboration between industry and academia and its contribution to long-term wealth creation. The 36 fellowships (funded from PGA, industry and other sources) completed since 1995 have resulted in seven novel products under development including a new design of aircraft generator, a possible new anti-infective agent, improved varieties of sugar beet and mathematical methodology, software and algorithms. Another 10 products were being considered for development. Given the success of this scheme, we have bid to OST to increase the number of awards available. The speculative research that we fund under our other fellowship schemes also contributes to wealth creation. For example, research by one of our URFs into artificial vision systems has been used to create special visual effects in many films including "Harry Potter and the Philosopher's Stone" giving a boost to the UK entertainment industry. In addition, £250k of our private budget will be used in 2002–03 to support the Brian Mercer Innovation Awards that enable important scientific discoveries to be taken through to commercial exploitation.

2.5 *Increasing support for women in science*

Many women who enter higher education with the intention of pursuing science-based careers leave the profession early with a loss of talent and the nation's investment in their training. The Society was one of the first to tackle the loss of women at the postdoctoral stage with the creation of the Dorothy Hodgkin fellowship (DHF) scheme. There are currently 37 DHFs funded from PGA and 18 from private funds, and the public funding was doubled after the last spending review. This scheme is playing a vital role in keeping excellent women in science at the time when they are most likely to leave and we are currently exploring further sources of sponsorship for additional awards under this scheme. We have continued this leadership role by funding privately a programme to examine what further we could do to promote women in science. As a result we have proposed two new schemes to OST: two-year relocation fellowships to reduce the numbers of scientists (mainly women) who leave science when their spouse or partner moves their workplace to another part of country; increased support for the Athena Project (See Glossary) to enable both the production of a comprehensive good practice guide and the funding of awards in recognition of outstanding progress in developing and implementing this good practice. These and other initiatives aimed at supporting women in science are outlined in Section 10.

2.6 *Providing direct support for research*

£2.7 million pa of our PGA is used for direct support to over 1,400 scientists in the UK in the form of research and conference grants. Our research grants provide vital pump-priming funding of up to £10k for cutting edge research that is rarely available from other funding bodies. We are able to fund only a small proportion of the increasing number of excellent applications and we have bid to OST for further money to increase the number of grants from (currently) 270 to 310. Our conference grants enable UK scientists to participate in prestigious conferences throughout the world and include a contribution to childcare costs for conference participants. As with our other funding schemes, the selection criterion is scientific excellence and applications are assessed by rigorous peer review. Further details of these schemes and our privately-funded university refurbishment schemes can be found in Appendix 1.

3. Strengthening the UK Science Base by Promoting International Research

3.1 *Background*

Most of the world's science is done outside the UK. As the Science White Paper pointed out, the UK has 1 per cent of the world's population, we fund 4.5 per cent of the world's science and produce 8 per cent of the scientific papers. If the UK is to remain competitive globally it must be closely tied in to what is going on elsewhere. The Royal Society's work in promoting international science is a vital part of ensuring that the UK benefits from and contributes to world-class scientific research. The Society's first Royal Charter states that Fellows should "enjoy mutual intelligence and knowledge with all manner of strangers and foreigners, whether private or collegiate, corporate or politic, without any molestation, interruption or disturbance whatsoever". Ever since this original commitment, the Society has encouraged scientists world-wide to combine their efforts for the benefit of the human race and to overcome the geographical and political boundaries that can often hinder such cooperation. We offer a range of grants and, acting as the UK academy of science, represent UK scientists in the international arena.

3.2 *Supporting international collaboration*

The purpose of the grants programme is to enable high calibre scientists to move to and from the United Kingdom to initiate collaboration, access unique sites or facilities, exchange ideas, gain new skill or link centres of excellence for scientific research. We focus our resources where there will be particular benefit to British science. Our exchange programmes concentrate primarily on countries with strong scientific infrastructure and countries such as China, Japan and Russia where access would be difficult for UK scientists without the benefit of our strong network of contacts.

Our exchange schemes fall into three categories: joint projects (seed-corn funding to support the early stages of an innovative bilateral research programme); fellowships (providing excellent young scientists with up to two years support in a different country) and study visits (short-term visits of between one week and six months); (see Appendix 4 for additional information). The majority of these exchanges take place under bilateral, partnership agreements with other academies of science and with leading scientific organisations overseas. We have over 50 partners who share the programme costs with us. A survey of academics, conducted as part of the external review of our international programme, identified the breadth of scientific subject application, flexibility, simplicity of the application procedure, rapid turnaround time and the assistance provided by experienced Royal Society staff as the key attractions of these schemes. The broad geographical distribution of our grants funded from public and private sources is shown in the pie charts in the Appendix.

3.3 *Attracting young talent to the UK*

The recent reviews of our international work have confirmed the importance of our schemes. The UK remains one of the preferred destinations for post doctoral researchers from overseas but the opportunities for the best and brightest to come here are very limited. The Society has identified several countries whose scientists are of the highest quality and where we believe a benefit will accrue to UK by providing opportunities for them to work here. At the last spending review, the Society successfully bid for a new incoming USA fellowship programme as part of its wish to contribute to "brain gain not brain drain". This programme has been widely welcomed on both sides of the Atlantic and the first awards will be made this year. Subject to a successful bid to OST, we intend to establish a similar fellowship programme to attract postdocs from other countries with a strong science base.

3.4 *Working with other academies*

The Society maintains close links with other national academies of science across the world through formal associations and joint meetings. There are four main international associations of academies:

- the European Academies' Science Advisory Council (EASAC) established at the Society's initiative in 2001 to provide independent policy advice at EU level in a manner analogous to the Society's policy advice work at UK level. The Society has submitted a bid, through the spending review, for £80k annually from 2003–04 to support EASAC, the secretariat for which is based at the Royal Society.
- the European Federation of National Academies of Sciences and Humanities (ALLEA) founded in 1990 which includes academies from 38 countries in Eastern, Central and Western Europe. It provides support for academies, especially those going through major transitions, and comments on aspects of policy for science at European level, for example on science and ethics, patents, copyright and research in smaller countries.
- the InterAcademy Panel (IAP), founded in 1995, a global network of 85 science academies designed to facilitate mutual support among its members and to offer independent advice on policy matters such as sustainability, a major statement on which was largely drafted by the Society and published in 2000.
- the InterAcademy Council (IAC) established by leading IAP members in 2000 to ensure that policy-makers in transnational bodies receive independent advice on international scientific issues, such as climate change and capacity building.

The Society builds on its excellent relations with other academies to create informal consortia for specific projects. Major reports that the Society has produced recently in this way include:

- Measures for controlling the threat from biological weapons, following a joint meeting with the US National Academy of Sciences and the French Academie des Sciences.
- Transgenic plants and world agriculture, published jointly with the Third World Academy of Sciences and the academies of Brazil, China, India, Mexico and the United States.
- A statement on climate change, published rapidly with 16 other academies from all parts of the world in May 2001 as a guest editorial in the highly influential US-based journal Science, in response to media reports that the President of the United States doubted the scientific case for reducing emissions of greenhouse gases.

As these examples demonstrate, close links between the world's academies help us to tackle scientific issues that have an international significance. With the increasing importance of science, engineering and technology on the world stage, the Royal Society expects to devote more resources to cultivating links with other academies over the next few years.

3.5 *Strengthening the UK's role in the International Council for Science*

In 1900, the Royal Society, together with the Academie des Sciences and the US National Academy of Sciences helped to establish what is today called the International Council for Science (ICSU). Initially, Britain's subscriptions to ICSU were paid by the Society from its private funds, but the government recognised the importance of British scientists contributing to the international bodies and in 1920 increased our PGA to cover these and similar payments to other international bodies. Today the Royal Society continues to represent the UK on ICSU. Over the last four years, we have been reviewing our membership of the 38 affiliated scientific unions and, as a result, have withdrawn from two and have passed on responsibility for membership of 17 other discipline-based unions to the relevant UK learned societies, although we continue to pay 49 per cent of the subscriptions. This rationalisation has brought UK scientists closer to their relevant international bodies and improved the value for money that the UK secures from membership. The Society provides financial support for UK delegates to participate in the business meetings of ICSU, its affiliated Unions and other international bodies, thus helping UK scientists to take part in shaping international science policy.

ICSU has been appointed by the United Nations as scientific organising partner for the World Summit on Sustainable Development to be held in Johannesburg in September 2002. The Royal Society helped to draft an ICSU report for the summit and is working with the Department for the Environment, Food and Rural Affairs to ensure that the UK delegation to the summit is up to date on scientific aspects of sustainable development.

3.6. *Promoting links with scientists and policy-makers in other countries*

The Society's excellent worldwide reputation means that we receive many high-level delegations from overseas, either independently or in concert with government departments. The Society's Officers and staff also help to prepare briefs for senior UK delegations to other countries, and in some cases join government ministers and officials on trips to countries where the Society is particularly active in promoting British interests, such as India, China and Taiwan. These activities are funded in part by the PGA and in part by the host country.

3.7 *Supporting major international research projects*

The Society supports three major international environmental research projects: in Danum Valley, Malaysia, looking at tropical rain forest regeneration and biodiversity; at Lake Baikal in Siberia looking at long term climate change; and jointly with the Royal Geographical Society in the Indian Ocean on marine biology. Our grants provide long-term support for research where long-term datasets are essential and help to meet conservation and training objectives in these sites of immense environmental significance.

4. SELECTION AND EVALUATION PROCESSES

4.1 *Selection process*

The selection procedure for all of our awards is based on rigorous peer review. International referees and panels of leading experts in their fields undertake the peer review and selection of applications with both Fellows and non-Fellows involved in the process. The primary criterion for selection is scientific excellence although for some fellowships, such as the Dorothy Hodgkin scheme, a secondary criterion is the degree to which the person will benefit from the scheme. This accounts for the higher success rate of women applying for this scheme. Success rates for male and female applicants to the URF scheme are approximately equal while in the last round of the Research Professor scheme, female applicants, based on the sole criterion of excellence, had a higher success rate than men (12 per cent vs. 4 per cent). Referees and selection panels are specifically reminded of the importance of considering outstanding scientists with non-traditional backgrounds, candidates who have had a late start in higher education or whose progress has been interrupted by career breaks or relocation. A strict vested interest policy ensures that anyone connected with the applicant is excluded from the decision making process. Only 4.5 per cent of award holders are Fellows of the Royal Society (FRS) and there is, of course, no requirement for applicants for any of our schemes to have sponsorship from a FRS. Our research fellows are distributed throughout the UK including at post-1992 universities such as Portsmouth and Liverpool John Moores (see Appendix 9). 31 per cent of our award holders choose to take their research fellowships to Oxford and Cambridge, universities that are widely recognised internationally as centres of excellence across the range of the scientific disciplines. Applicants for international grants and awards are assessed in a similar way, and our partners overseas undertake the peer review for award holders coming to UK.

4.2 *Evaluation*

The monitoring, evaluation and review of our fellowship and grant schemes are vital to ensuring that they remain effective in supporting scientific excellence. We have just completed a detailed evaluation of outputs and outcomes from our industry fellowship scheme that confirmed its value in promoting innovation and collaboration between academic and industry scientists (see Appendix 2). We are currently undertaking a similar evaluation of our other fellowship schemes. We also use exit questionnaires to monitor whether schemes are meeting their objectives. An analysis of URF exit questionnaires (Appendix 3) indicates the high level of satisfaction with the scheme but indicates that a small number of fellows felt isolated. Now this problem has been identified, we intend to address it by holding more regional seminars for URFs.

There have been three recent reviews of our international grants work. The whole of our international portfolio was externally reviewed in February 2002 and the recommendations are currently being implemented. An internal review of the joint projects schemes in January 2002 indicated the wide range of outcomes from these awards. These include: successful applications for further funding from other bodies; scientific publications and conference proceedings (average of eight per project); establishment of new laboratories; patents filed; products under development; and prizes awarded to UK researchers and their collaborators. We monitor and evaluate our programmes and adjust budgets where necessary to reflect external changes. The third review was of our European programme which strongly endorsed the present arrangements and commented on the cost-effective administration of the scheme.

4.3 *Cost efficiency*

We administer our programme as efficiently as possible while offering the high levels of personal support to our award holders that are a key feature of our schemes. We continue to work to improve their cost effectiveness including the use of internet and web technologies and teleconferencing for selection panels and more details are given in section 14.2.

5. PROMOTING SCIENCE EDUCATION

5.1 *Background*

Science education today has a dual role to play in ensuring the UK's future prosperity. It must encourage the training of sufficient numbers of scientists and engineers for the UK to compete successfully in the global market. It must also provide the right environment and means for all young people to be equipped to engage critically with the increasing number of science related issues which will affect the lives of citizens in the 21st century. The Royal Society is committed to promoting an education system that is able to fulfil this dual role effectively. We seek to do this through education policy advice to government, projects that bring young people and scientists together, and an innovative programme of activities with matching resources to support teachers and enthuse pupils.

5.2 *Advisory work*

The Royal Society seeks to influence what and how science and mathematics are taught in school. Drawing upon the expertise of the Society's education committee and a large network of contacts within the education world, the Society offers advice to government and its agencies on a wide range of science and mathematics education policy issues, from the structure of the curriculum to teacher supply and support. The education committee has members drawn from the secondary school and further and higher education sectors and also includes observers from OFSTED, the Qualifications and Curriculum Authority (QCA) and the Department for Education and Skills (DfES).

The Society's advisory work on education policy can be divided into three types:

- representation on key education working groups of government and its agencies eg DfES and QCA;
- responses to consultations by government departments and Parliamentary select committees; and
- proactive policy studies resulting in published reports.

5.3 *Representation on key education committees and working groups*

The Society seeks representation on government working groups we consider to be working to improve science and mathematics education. Currently, the Society is represented on the DfES Key Stage 3 Science Strategy working group and the QCA groups on "Keeping school science in step with the 21st Century" and "Science Curriculum: ongoing monitoring". Membership of these groups allows the Society to influence policy at an early stage of formulation. In addition to these formal working groups, the Society often attends *ad hoc* meetings called by government or other organisations to discuss specific issues in science education.

5.4 *Responses to consultations*

The Society is often able to present its views to the government and its agencies through its representation on relevant working groups, reducing the need for the Society to respond to formal consultations. This, coupled with the pressures on staff time (our education team consists of three staff), has led the Society to adopt the strategy of only responding to consultations about issues of extreme importance, such as the inquiry into 14–19 science education by the House of Commons Science and Technology Committee.

5.5 *Policy studies*

The education committee identifies topics on which the Society should initiate studies. The Society usually undertakes one major study each year, sometimes in partnership with other organisations (eg learned societies, the Association for Science Education, etc), and contracts out any additional research needed for the study. Recent reports have included the teaching of geometry to 11–19 year-olds and school science technicians (which is now influencing the national numeracy strategy) and school science technicians (the recommendations of which are being taken forward by the DfES in consultation with the Society). Given limited resources, the Society concentrates on areas where we believe we can have greatest impact.

The documents are published and made widely available to policy-makers, schools and universities and other interested parties. Once a document is published, the Society continues to use its influence to push for the implementation of recommendations contained in the report—the desired outcome being an improvement in UK science and mathematics education. Further details can be found in Appendix 5.

5.6 *Future education policy advisory activities*

During 2002–03, the Society expects to respond to the DfES consultation on 14–19 education and to undertake a project on assessment in school science, considered to be the most contentious issue in science education today. The project will include a seminar for educationalists, teachers and scientists, the proceedings of which will be used to produce a consultation document for circulation among the wider education and scientific community.

In March 2002, the Society and the Joint Mathematical Council launched the Advisory Committee on Mathematics Education (ACME). This body, bringing together schoolteachers, lecturers from universities and colleges, and educationalists, will seek to give the mathematics community a "single voice" on education policy issues. ACME is based at the Society and funded from private sources.

5.7 *Educational programmes*

The Society is currently pursuing three major activities to support and enliven science in schools.

The partnership grants scheme, launched in 2000, has so far awarded nearly £170k to 107 schools, giving about 12,000 pupils and their teachers the opportunity to work with scientists or engineers on exciting projects. From ongoing evaluation of the scheme, we have found that over two-thirds of projects have created new partnerships between schools and scientists, and 86 per cent of the teachers feel their pupils have gained better practical and thinking skills and more interest in science because of the scheme. Of the projects funded so far, more than half have involved primary schools and 95 per cent are in state sector schools. The scheme is funded jointly by the Mercers' Company, ExxonMobil and our PGA and complements the government's science and engineering ambassadors programme.

The Society is also working jointly with Sheffield Hallam University on the Acclaim Project, designed to raise young people's awareness of cutting edge scientific research in this country and of the achievements of UK scientists. The Acclaim project is funded jointly from private sources and our PGA, and among future developments of the project under consideration is a focus on scientists from the ethnic minorities as role models.

A new website (http://www.sc1.ac.uk) was launched by the Society in 2001, aiming to stimulate the interest and excitement of 16–19 year-olds in modern scientific research. The first phase of the website's development, approved by the National Grid for Learning, features an interactive guide to the Society's Summer Science Exhibition (see Section 6.2), where visitors can tour exhibits of cutting edge research, find out about some of the scientists taking part and express their opinions on topical issues in science. The second phase of development, to be launched later this year, will feature the latest news in science, with reliable information on issues about science in society. This will be funded from a combination of PGA and private sources.

Further details of the full range of the Society's educational programmes are given in Appendix 5.

6. ENGAGING THE PUBLIC

6.1 *Background*

The Society recognises the importance of encouraging communication between scientists and the public. Using our network of the best UK researchers who offer free and enthusiastic support for our work, our excellent venue and our contacts with non-scientists, we are extending our science communication activity. We hold major events which allow the public to find out about the latest scientific advances and to consider with scientists the consequences their work may have for society. Our strategies for engaging the public is focused on four main activities.

— a Summer Science Exhibition

— a series of public lectures and discussions, featuring leading scientists presenting and discussing the latest developments in their fields;

— an innovative Science in Society programme, exploring new ways of encouraging dialogue between scientists and the wider public; and

— a media relations operation, run through our privately funded press office, to raise the profile of all the Society's activities and to highlight the achievements of UK science.

6.2 *Summer Science Exhibition*

The Summer Science Exhibition is the Royal Society's main public event of the year displaying exciting advances in research. It provides a unique opportunity for leading scientists to discuss their work with a range of people and answer questions about their work. Around 3,000 people, drawn from the public, schoolchildren and their teachers, the media, policy-makers and scientists visited the exhibition over three days in July 2001. In 2000 the exhibition was also held in Edinburgh and we will continue to take the exhibition to venues outside London on a periodic basis subject to funding being available.

Participation in the exhibition is highly competitive and the selection criteria are interactivity, general appeal and, most importantly, the excellence of the science. The exhibits this year include an investigation into a new radar system that can track insects at altitude, the latest developments in cryptography and visual search strategies.

The Society takes full advantage of this presentation of exciting science to bring together leading scientists, parliamentarians, government officials and other policy-makers, industrialists and the media at evening receptions (soirees). These occasions provide excellent networking opportunities for many of those who are determining the future of UK science engineering and technology. Some of these receptions are devoted to the education sector with teachers and educationalists among the guests. The cost of the soirees is met entirely from the Society's private funds.

6.3 *Public programme of meetings, lectures and debates*

The Society encourages leading scientists to interact with the public directly and explain their exciting work through public lectures, meetings and discussions. The Society is uniquely placed to achieve this through its extensive network of Fellows and research appointees, and its events always contain opportunities for debate. The public programme consists of a variety of events addressing scientific related topics. In the past year, the programme has included events about:

— the latest developments in contemporary science

— science and public policy.

— the interface between the sciences and arts;

— the history of science.

Several of these events were staged at venues other than the Society's premises, featuring 36 speakers and in partnership with seven other organisations. For example, in March 2001, the Society in partnership with the Wellcome Trust held a public debate about how people might be affected in the future by the successful mapping of the human genome. In December 2001, the Society organised at short notice a public discussion meeting on bioterrorism, in partnership with the British Association for the Advancement of Science. The Society recognises that public events held at other venues can attract a different audience. For this reason, it has recently worked with organisations such as Tate Modern, the National Portrait Gallery, the Institute of Contemporary Arts, the Cheltenham science festival and the annual British Association festivals held around the country. The Society also hosts the UK's premier prize for science communication, the Michael Faraday Award. Recent winners include Sir Harry Kroto, Lord Robert Winston and Baroness Susan Greenfield.

6.4 *Science in Society programme*

The programme was established in 2000 in response to growing concerns among scientists that the wider public no longer trusted them particularly on issues such as BSE and genetically modified crops. A thorough investigation of this "crisis of confidence" in science was presented in the report of the inquiry into "Science and Society" by the House of Lords Select Committee on Science and Technology, published in February 2000. The Science in Society programme is designed to ensure that the Royal Society is in a position to demonstrate leadership in developing a dialogue between scientists and the wider public.

The aims of the Science in Society programme are to:

- help restore public confidence in science;
- find and develop new, interesting, widespread and effective ways of communicating with the public;
- make sure that the voice of the public is heard when discussing and shaping science policy; and
- take a leading role in promoting national science policy debate.

The programme committee is chaired by Sir Paul Nurse, Director General for Science at Cancer Research UK and joint holder of the 2001 Nobel Prize for Physiology or Medicine, and has wide membership (see Appendix 6 as an example of the makeup of some of our committees).

The main activities that have been carried out for the programme between its inception in May 2001 and March 2002 are:

- public dialogue meetings in Birmingham, Manchester, Glasgow and Cardiff;
- a National Forum for Science in London;
- a pairing scheme for research scientists and parliamentarians; and
- an online dialogue facility.

Dialogue meetings involved scientists, representatives of non-governmental organisations and other stakeholder groups, and members of the public who were invited through advertisements in local newspapers. The meetings sought understanding and agreement about the underlying causes for the deterioration in public confidence in areas of science and scientists themselves, and to identify ways in which this trend might be reversed. The Forum in March was attended by parliamentarians, senior government advisers (including five chief scientists), journalists, representatives from non-governmental organisations, scientists, participants from the regional meetings, representatives of religious groups, and members of the wider public. They considered aspects of the central theme "do we trust today's scientists?" The major outcome from the Forum was a 30 point "action plan" drawn up by the participants, designed to restore public confidence in science. The Society is currently evaluating the Forum and discussing ways of implementing key elements of the action plan.

Other aspects of the programme include the MP pairing scheme which is now being evaluated, the Science in Society web site which provides opportunities for the public to interact with the Society over topical issues. The programme also impacts on other aspects of the Society's work particularly on the ways we consult the public and stakeholder groups in preparing advisory reports. The programme is funded over five years by a £1 million grant from the Kohn Foundation.

6.5 *Media and public relations*

The Society has increased its investment in media relations over the past few years to raise the profile of our activities and of UK science in general, and to encourage more scientists to engage with the media. This includes the running costs of the press office, the arrangement of press conferences and briefings for the Society's activities, the production of the Society's corporate magazine "Excellence in Science", the preparation of a range of publicity materials, including the annual "Review of the Year", and the development and maintenance of the Society's website. The Society also provides funding for young scientists to develop their media and communication skills.

The work of the Society's press office is entirely funded from private sources, but includes the promotion of activities funded from PGA. Since the controversy over GM foods, the Society's press office has been very active in fielding credible spokespersons to provide authoritative and independent views on a range of policy issues of public concern and interest, such as cloning, depleted uranium and nuclear power. It has sought to publicise widely the Society's advice to government and agencies on policy issues, as well as our programmes funded from PGA and private sources, and the achievements of the UK scientific community in general.

The Society has improved its contacts within the print, broadcast and new media and through them has targeted a wide cross-section of the UK public. It has worked co-operatively with *The Daily Telegraph*, the Today programme, BBC4 and *The Sun* to encourage their audiences and readerships to participate in the Society's activities, such as a public meeting on the consequences of sequencing the human genome.

The Society's presence on the web has increased significantly over the last two years since the re-launch of the corporate website. The Society now reaches a wide audience through five microsites, each with its own unique function in fulfilling its plethora of roles. The last year has seen hits on the corporate website double to more than two million per month, with our key audiences residing in the US, UK, Canada, Japan, Australia and Germany. Future web developments include the addition of further interactive features on the scl education website incorporating an online version of the 2002 Summer Science Exhibition and the creation of a microsite showcasing innovative science supported by the Royal Society. The internet plays a key role in stimulating dialogue and increasing the dissemination of information, and the Royal Society's websites strive to provide scientists, government, the media and public with access to reliable information at different levels, facilitating the Society's objectives, through the continual development of innovative online resources.

Since 1999, the Society has offered courses in media training and communication skills to its post-doctoral research fellows and those funded by other bodies. Professional trainers from outside the Royal Society are used for these events. Of the 176 scientists (52 per cent of whom were women) who took part in these courses, 159 were funded by the Society and 17 were supported by the Particle Physics and Astronomy Research Council and the Engineering and Physical Sciences Research Council (EPSRC). In 2002–03, the budget for these training courses will be £15k from PGA and £50k from private sources. The Society is seeking further funding from private donors to allow the training courses to run during the following years. The welcome additional funding by EPSRC of communication aspects of the projects it finances presents new opportunities and we have already had discussions with EPSRC over this.

7. Providing Independent Authoritative Advice

7.1 *Background*

The Society's core objectives include that of providing independent and authoritative advice on policy for science and on scientific aspects of public policy in the UK and worldwide. Over the next three years we plan to develop further the high profile that our policy work enjoys, to provide an energetic lead in generating independent policy advice at EU level, and to extend our skill in handling policy issues that attract wide public interest and controversy. The Society has maintained a long tradition of providing independent non-partisan scientific advice to government. For example, in 1772, during the height of the American War of Independence, the government asked the Society for advice about the best form of lightning conductors to protect buildings and stores of gunpowder magazines. A committee of Fellows, including Benjamin Franklin, concluded that sharp pointed conductors were better than blunt ones. However, when King George III learned that the Society had backed a design favoured by the American rebel Franklin, he put pressure on the Society's President, Sir John Pringle, to overturn the decision. Pringle reputedly responded by saying that his duty and inclination would always induce him to execute His Majesty's orders to the utmost of his power but that he found it impossible to reverse the laws and operations of Nature. The Society continues this valuable independent advisory role today.

7.2 *Conduct of science policy projects*

Our science advice work is intended to influence the policy process, so that policy-makers are aware of the scientific dimensions of the issues they are tackling and can take account of the best possible scientific understanding when forming their views. Although policy projects take many forms they all begin with careful preparation designed to establish whether the issue concerned does indeed have a scientific dimension capable of evidence-based analysis, whether there is a clear target audience that could be influenced by the project, whether we have a proper understanding of stakeholders' concerns and whether the project can be completed in time to influence the policy process.

Most projects involve a working group of some kind to produce a report or organise a conference or workshop. The membership of such a group is critical. The Society exercises care in selecting members to ensure that the full spread of relevant scientific and other opinion and experience is represented. In general, a project focused primarily on establishing scientific evidence will tend to be conducted by a group of scientific experts while a project that involves making recommendations about policy options is more likely also to include non-scientist members.

Working groups are composed of a mixture of Fellows and non-Fellows according to the expertise needed. For instance, the Royal Society working group that produced the recent report on health effects of depleted uranium consisted of 11 members, of whom only two were Fellows, and the Royal Society working group that produced the February 2002 report on genetically modified plants for food use had 10 members, of whom six were Fellows.

All of the Society's science policy reports are based on evidence—preferably publicly available evidence such as scientific papers in peer-reviewed journals. Working groups consider the available evidence relevant to their formal terms of reference and in some cases may issue a public call for evidence to ensure that the widest range of views is obtained. Where appropriate, working groups also invite selected parties to give oral evidence and make use of our website to solicit further inputs. Reports make clear the evidence on which their conclusions are based.

In those cases where there is a marked public interest in the issue, the Society is developing its processes for positively enabling all those with a stake to engage with the project. For example, in the latest GM project eight individuals and 13 organisations responded to a call for written evidence, seven individuals and representatives of concerned organisations gave oral evidence to the working group, and summaries of these sessions were placed on the web. The work on depleted uranium involved 28 written submissions, meetings with 31 individuals and organisations, an open meeting with 80 participants to discuss the findings from the part I report (a summary of the meeting was published on our the website), and five subgroups working with outside experts to review the latest science developments in detail.

Our current major project on infectious diseases in livestock, which was one of three inquiries commissioned by the government following the outbreak of foot and mouth disease in 2001, has so far involved 380 written submissions, site visits to Cumbria, Dumfries and Galloway and Wales, an open public meeting in Carlisle with 100 participants and much media interest, meetings with 50 other individuals and organisations, and three subgroups working with outside experts. The evidence will be published on our website when the main report is published.

Our approach to policy work is continuously evolving and for example the Science Advice section is working closely with the Science in Society committee to develop and implement best practice in involving stakeholders in policy work.

Reports are written in a manner appropriate to their target audience. This includes length, technical content and linguistic complexity. The type and scale of dissemination activities are tailored to each individual project. These may include publication of a document, both in printed format and on the Society's website; press conferences and/or press briefings; briefings for parliamentarians and other policy-makers; public meetings; extensive targeted mailings of summary versions; articles placed in relevant publications, including the national and scientific press; private meetings with ministers and other targets; and seminars.

Formal statements or reports published in the Society's name are subjected to a review process and approved by the Society's Council. In the last 12 months, the Society has published 10 major policy statements and reports, in addition to numerous submissions, on issues ranging from the use of genetically modified animals to the health hazards of depleted uranium munitions. These reports are listed in Appendix 7.

Science policy projects are funded from private and public sources, according to context but the source of funding never influences the conduct or outcome of a science policy project.

7.3 *Science policy work in relation to government and parliament*

It can sometimes be difficult to identify tangible evidence of the Society's influence on a particular policy, as government departments and select committees are not obliged to respond directly to the Society about its advice, even if they intend to act upon it. The House of Commons Science and Technology Committee report on the Scientific Advisory System recommended that "Government should be aware that we will consider using our powers to insist on a memorandum from the Government responding in full to the recommendations made in reports by the Learned Bodies."

Nevertheless, some recent examples of the direct influence of our work include:

- following publication of the Society's second report on depleted uranium in March 2002, the Ministry of Defence launched its proposed research programme, which was described as being "in line with the recommendations of the Royal Society's report";
- after publication of our report on nuclear energy, the Department for the Environment, Food and Rural Affairs has this year been consulting on whether the Society should have a formal role in advising the government on the management of radioactive waste;
- our work on stem cells and cloning influenced debate both within and outside Parliament before the relevant Act was extended to cover research on human embryonic stem cells.

The Society responds to consultations carried out by a number of select committees and we maintain regular links with the science and technology committees of both Houses.

7.4 *Science policy advisory work with other academies and learned bodies*

The Society tends to tackle policy issues that span more than one field of science, engineering and technology and thus lie beyond the expertise of any individual learned society or professional association. As the expertise of the Fellowship covers a broad range of disciplines the Society is uniquely placed to assemble strong working groups to tackle cross-disciplinary and multi-disciplinary issues. On some issues, however, the Society has found it more effective to tackle issues jointly with other UK academies.

We provide the secretariat for the National Academies Policy Analysis Group (NAPAG) which brings together the Royal Society, the Royal Academy of Engineering, the British Academy and the Academy of Medical Sciences. NAPAG has tackled broad themes such as research funding, intellectual property rights, and energy and the environment, producing influential policy reports. More recently NAPAG has tended to operate as a forum for informal discussion of mutually important policy issues between the Academies.

We have also published two major energy policy documents with the Royal Academy of Engineering focusing on the case for keeping the nuclear option open in the UK, and on the content of the European Commission's Directive on renewable energy. Similarly, the Society and the Academy of Medical Sciences jointly published an assessment of the current state of knowledge about transmissible spongiform encephalopathies (eg BSE and scrapie) which concluded that there was a very small theoretical risk of meat being contaminated with BSE in a few abattoirs. As a result the Food Standards Agency issued closure orders for the affected abattoirs.

7.5 *Funding and future priorities for science policy advisory work*

In 2002–03, the budget for science policy advisory work is expected to be £268k. Of this money, £100k will be allocated from PGA, £40k to cover the costs of specific projects and £60k to fund a full-time manager's post with overheads.

In 2003–04 and for the following two years, this budget is expected to rise to £339k. The PGA component will be £150k, which includes a bid of £50k from the spending review to support the development of public consultation activities carried out in connection with the Society's science policy advisory projects. The private component of the budget will rise to £189k of which £48k will fund specific projects, £3k will support the work of the Society's policy advisory committees and £138k will fund three full-time manager posts. The Science Advice Section has a core complement of 12 full-time staff, mostly supported from the Society's private funds.

8. SUPPORTING SCHOLARSHIP

The Society promotes and supports scholarship by holding discussion meetings about cutting edge science, producing world-class academic journals, maintaining an internationally renowned library and archives and awarding prestigious medals and prizes.

8.1 *Scientific meetings*

One of the primary reasons for the foundation of the Society in 1660 was to provide an opportunity for scientists to gather and discuss their ideas and theories. The Society today maintains that proud tradition by holding up to 12 major scientific meetings each year, to advance knowledge of a particular area of rapidly developing science, to bring together scientists across disciplines and from different countries, and to allow students and other scientists to attend high-level scientific meetings at no cost. Proposals are assessed on scientific excellence and timeliness, with priority given to new or emerging areas of research. The Society actively encourages organisers to include the best international speakers in the programme. The papers and discussions from these meetings are subjected to peer review and published in Philosophical Transactions of the Royal Society.

The Society recognises that some scientific issues, particularly those with particular social or political significance, may arise suddenly and that "fast track" discussion meetings, organised at relatively short notice, may be desirable. For this reason, the Society has set aside the resources to hold up to two "fast track" meetings per year. One such meeting, on stem cells, was held in June 2001 as a contribution to the inquiry by a House of Lords committee. Another brought together 300 leading experts and other participants from around the world to debate the controversial issue of the origin of HIV and AIDS. The meeting attracted worldwide media interest because new data was made public for the first time to counter claims that the start of the AIDS epidemic was linked to polio vaccinations. In addition, the Society is developing plans for a regular series of meetings and associated events that bring together scientists and representatives from the financial sector.

8.2 *Publishing world class academic journals*

The Society publishes five internationally respected journals, including *"Philosophical Transactions"*, the world's oldest scientific periodical, which first appeared in 1665. The titles are:

- *Philosophical Transactions of the Royal Society: Mathematical, Physical and Engineering Sciences,*
- *Philosophical Transactions of the Royal Society: Biological Sciences,*
- *Proceedings of the Royal Society: Mathematical, Physical and Engineering Sciences,*
- *Proceedings of the Royal Society: Biological Sciences,*
- *Notes and Records,* dealing with the history of science, engineering, medicine and technology.

As the world's longest established scientific publisher, the main purpose of producing these journals is to enable scientists to disseminate new findings to a wide audience and to put into the public domain new information about science, scientists and the history of science. The journals make maximum use of electronic production and delivery and the Society is recognised as a leader in the provision of editorial services. The income generated in relation to publications, primarily through subscriptions, is sufficient to fund the editorial and production operations, and creates a significant surplus that is invested in other areas of the Society's activities. This surplus is expected to be £293k in 2001–02.

8.3 *Maintaining an internationally renowned library and archives*

The Society's library is a world class resource for the history and development of science in the UK. The library is open to the public, receiving more than 2,500 visitors last year and dealing with over 4,500 enquiries. The collections date back to the foundation of the Society in 1660. Among its many strengths are internationally important collections of 17th and 18th century scientific books, journals and archives, which provide an unrivalled record of the development of modern science over the last 350 years. Since 1660, the Society has maintained detailed records of its activities as well as creating, from its own material, by gifts, or by purchase, an impressive collection of manuscripts, including Sir Isaac Newton's seminal publication *"Principia Mathematica"*.

The collection includes Fellows' correspondence, notebooks, scientific papers and personal papers, which record their experimental and scholarly research. In addition, the library hosts artefacts of historical importance, as well as portraits and etchings of individual Fellows. The library has nearly 70,000 books, 3,200 journal titles and 2,000 feet of archive material. A key objective of the Society is to increase access to these collections for scholars across the UK and worldwide. The Society's Sackler Archive Resource is a unique database of biographical information about Fellows since 1660. It is available online together with our catalogue of books and journals. The Society also works in partnership with other bodies and has led the "Web of Science History" consortium project to give online access to lists of scientists' papers.

The Society provides funding for one or two day meetings on the history of science and manages grant applications for projects on the history of science. It currently sponsors three major projects, the Banks archive project, the Charles Darwin correspondence project and the National Cataloguing Unit for the Archives of Contemporary Scientists.

8.4 *Recognising excellence through medals and awards*

The Society awards prize lectures and medals in recognition of excellence in science, engineering and technology. There are currently 24 such prizes, and all of the costs arising from these are met from private funds, most of which have been bequeathed to the Society for that explicit purpose.

In 2003, the Society will introduce a medal commemorating the work of Rosalind Franklin, who helped discover the structure of DNA. This annual award, funded from PGA, will consist of a specially designed medal and a grant of £30k to use for the recipient's research. The winner, likely to be a mid-career scientist, will be expected to undertake activities as part of his or her award to promote science, engineering and technology to girls and women.

9. SUPPORTING OTHER SCIENCE ORGANISATIONS IN THE UK

In addition to its own activities and the support we provide for individual projects conducted by other bodies, the Society provides funding for three other organisations that play a key role in science education and engaging the public in scientific issues. The Society gives grants to the Royal Institution of Great Britain, the British Association for the Advancement of Science and supports COPUS from its PGA funds.

The Society's role is to ensure that PGA funds are administered in the most effective way and that proper evaluations are carried out of how the sums are used. This role has been established through the Society's track record in distributing and accounting for money on behalf of the Office of Science and Technology.

Royal Institution of Great Britain

The Royal Society has supported the Royal Institution's young persons programme since 1976. Today, the annual programme of about 100 lectures is designed to complement science teaching in the classroom and covers all age ranges from primary to sixth-form. In 2000, the Royal Society initiated an independent evaluation of the programme to seek improvements. The review identified a number of ways of revitalising the programme and making its operation more efficient. In 2002–03, the Society expects to increase the grant for the programme from £94k to £100k, and has bid for further rises to £120k in 2004–05 through the spending review.

British Association for the Advancement of Science

The Society has provided an annual grant to the British Association since 1973. The grant is currently split into £135k for core funding, £50k to be divided between youth activities and the annual festival. An internal audit of the Association was carried out in 2001–02 at the Society's behest and, as a result, the procedures for accounting for, reviewing and evaluating activities funded from PGA are being tightened.

COPUS

COPUS was set up in 1985 by the Royal Society, the British Association and the Royal Institution. Financial support has always been provided through the Royal Society. In 2001, a fundamental review of the aims of COPUS was completed. As a result, COPUS was re-constituted as a body that is advised by a Council representing a wide variety of bodies involved in science communication.

10. PROMOTING WOMEN IN SCIENCE

> "The idea, and it is an admirable one, is that there is a recognised system for younger female scientists to engage the support and advice of the battle-hardened".

Baroness Susan Greenfield commenting on the mentoring scheme for Royal Society's Dorothy Hodgkin research fellows in The Independent March 2001.

10.1 *Background*

Although many women in UK study for first and higher degrees in science, engineering and technology, there is steady drop-out at each career stage up to professorial level resulting in only 8.9 per cent professors in the UK. Thus, there is a relatively small pool from which the Society can find women with suitable levels of achievement for nomination to the Fellowship. It is this situation that needs to change if the number of female Fellows is to be significantly increased in future.

In March 2001, the Royal Society held a meeting entitled "How can the number of women in senior SET posts in the UK be increased?" It was attended by women scientists at all levels from junior post doctoral researchers to Fellows of the Royal Society. A number of barriers to women's progression to the top were identified and many wide-ranging recommendations for change emerged. The Society is trying to take forward those recommendations relevant to us. The meeting found there to be general lack of awareness among both men and women in academia about gender and equal opportunity issues. The following is a summary of what the conference discussed.

To improve the retention of women in science, there is a need to create a culture in research departments that values diversity, supports flexible working and manages staff according to best practice including appraisal on the basis of achievement not hours worked. Mentoring and networking can help to overcome feelings of isolation and lack of self-confidence experienced by some women. Senior academics need to be more proactive in encouraging and actively supporting more women to apply for posts and for research funding.

Research is a very competitive field of work, demanding great time and effort, not only on the research itself, but also in writing numerous applications to get grant funding. There is a long-hours culture in science as there is in many other professions in the UK. There are few opportunities for women to work part-time (which many women with families wish to do) as it is difficult to maintain the volume of research required for success. Women still often take primary responsibility for child and elder care and thus find difficulty in balancing career and domestic demands on their time.

Many of the difficulties in career advancement faced by women are also faced by men, such as lack of a career structure for contract researchers (as opposed to lecturers etc.) in academia. This makes returning to work after a career break difficult for those who do not have substantive posts. Relatively low salaries do not make academic research careers as attractive as some other professions in the UK. The pace of change in research makes keeping up to date difficult during extended career breaks. Although new methods of communication make keeping up with published research easier, returners are often faced with having to develop new skills for which training is often not readily available.

Although there has not been much research in this area, it seems inevitable that taking a break leads to a reduced track record of publications that is potentially damaging to career prospects. Some funding bodies only take account of the past five years' publications when assessing applications for funding, thus discriminating against returners. Age limit restrictions on eligibility for research funding or posts discriminate against returners and late-starters (women who go to university after raising their families).

Women are often less mobile and they may find it more difficult to gain experience of working abroad or to move between different institutions in the UK in order to progress up the career ladder. Women with families may find it more difficult to attend conferences abroad with the result that they are less likely to achieve an international reputation and hence their research papers are less likely to be widely cited. Others may find their career progression disrupted by having to move their work more often than they might wish if their husband or partner moves his/her job beyond commuting distance.

High quality childcare is relatively scarce and expensive in the UK and academic salaries are lower relative to many other professions that have been successful in retaining women, such as medicine and law. Women, particularly those with more than one child, may find that almost all their salary after tax is swallowed up in childcare and other domestic costs.

10.2 *Actions by the Royal Society*

In 1995, the Society set up its Dorothy Hodgkin fellowship scheme to retain the most able women in science at the early career stage when many drop out by providing a recognised step to an independent research career. The scheme provides a full salary, plus annual research expenses, on flexible terms to allow career breaks/part-time working for recent postdoctoral researchers. The scheme is open to men and women but it is gratifying that many women have considered what these fellowships offer is particularly attractive (about 80 per cent of applicants have been women). Out of the 80 fellowships awarded 76 have been to women. Although the number of fellowships remains relatively small we continue to seek additional funds from public and private sources to extend the scheme.

Since 1983, 153 of 671 (23 per cent) of the Society's more senior university research fellows (URFs) have been female (the success rate for women applicants is the same at 7.9 per cent as for male applicants but fewer women apply). 79 of those women have now left the scheme and at least 20 per cent have become full professors. The cost of a Dorothy Hodgkin award (including research expenses and administration) is about £43k pa and for each URF about £53k p.a. Thus our current annual budget for our female URFs and DHFs alone is £5.3 million (£1.4 million + £3.9 million for Dorothy Hodgkin and female URFs respectively) representing a very substantial investment in supporting women in scientific areas. Two out of six of the new research professors appointed in 2001 are women as are five out of 19 current industry fellows. Of course many other women receive support from the Society's numerous other schemes including various grants and international awards. The Society is also involved with the Athena Project whose advisory committee is chaired by one of our Vice-Presidents, Professor Dame Julia Higgins.

Other steps the Society has taken to promote the interests of women in science include:

- avoiding age limits and focussing on years of research experience for eligibility for funding;
- encouraging more women to apply for research appointments and grants (by using existing ones as role models);
- offering flexible working conditions to all its research fellows (maternity leave, part-time working, up to two years working abroad) and additional support for women, if required (eg a contribution to childcare costs during field trips away from home);
- allowing conference grant holders to claim for childcare costs during the conference;
- running a mentoring scheme for the Dorothy Hodgkin fellows and providing training for them and their mentors;
- providing individual career guidance by staff and Fellows of the Royal Society to research appointees (also available to male research appointees) and opportunities to network with other people in science, particularly with FRSs;
- continuing to promote the implementation of the 1995 Concordat on contract research careers;
- working closely with other organisations such as WISE, AWiSE, WES, OST's SET for Women Unit, the Athena Project to promote the interests of women in science;
- seeking funding (from government and elsewhere) to support the Athena project in producing and distributing a comprehensive good gender practice guide for universities;
- seeking funding for a new scheme to promote career mobility in science for people who have to relocate their research to accommodate career moves by their spouse/partner (open to men and women but expected to benefit women as they are more likely to be the "following partner");
- drawing attention to women's achievements in science through features in publications such as Excellence in Science and on the Society's web site and promoting successful women as role models;
- broadening and simplifying the nominations process for election to the Fellowship to encourage more women candidates;
- wherever possible ensuring that women are represented in Royal Society activities including strategy and policy making, formulation of science advice, selection of new Fellows, research appointments and grants, scientific discussion meetings, education programmes and communicating science;
- setting up means of keeping up-to-date records of women's participation in our activities and tracking progress;
- in September 2000, a part-time senior member of staff (Dr Helen Pask) was appointed to co-ordinate the Society's efforts in this area.

10.3 *Conclusion*

The Society has full recognised that there is a problem with the small number of female scientists who reach senior positions in the UK and has been running the innovative Dorothy Hodgkin scheme for a number of years. However, we are very aware that more needs to be done and with this in mind last year we convened a conference to identify the issues and attempt to specify solutions. Following the conference the Society has embarked on a comprehensive programme of action to try to increase the number of women who remain in science and reach senior positions. This represents substantial investment by the Society but we recognise that the solutions we are implementing will take time to achieve the desired results.

11. The Society as a National Body

Although the Royal Society's offices are located in London, our activities and funding are spread throughout the UK. Within UK higher education, the Fellows of the Royal Society are located in 46 institutions in England, Scotland, Wales and Northern Ireland and our researchers hold posts at 37 universities, including Liverpool John Moores University, the University of Coventry and the University of Portsmouth (see Appendix 9). The recipients of our grants for research projects and international exchanges are also distributed widely across the UK.

Even though many of the Society's lectures and discussion meetings are held at our premises they still attract people from all over the UK. For example, in 2001, parties of post-16 students from schools based as far away from London as Leeds, Nottingham, Sheffield, Stafford, Derby, Yeovil and Taunton attended our Summer Science Exhibition. The Society also holds many events outside London. In the last 12 months, the Society's "Science in Society" programme has held regional dialogue meetings in Birmingham, Cardiff, Glasgow and Manchester, and a similar series of events are planned for the next year. We also held scientific prize lectures at the Universities in Edinburgh, Dundee, Cambridge, Manchester and Oxford and are organising public lectures for the science festivals in Leicester and Cheltenham.

Our educational programmes reach schools throughout the UK. Our partnership grants scheme has distributed funds throughout the UK to 107 schools. These grants support innovative projects that bring together practising scientist and engineers with school pupils and teachers. For instance, secondary school pupils at Reepham High School in Norwich are working with BT on a computer controlled telescope and robotic dome, while 90 schoolchildren at Deeplish Primary School in Rochdale have undertaken a "Fit for Life" project with the University of Manchester that includes studying how the human heartbeat responds to exercise. The Acclaim project, carried out in partnership with Sheffield Hallam University, has so far distributed more than 550 curriculum packs (including videos of the "Living Science" series) to English schools, representing about 15 per cent of secondary schools. The six scientists and engineers whose work is featured in the project have given talks to audiences of young people in Belfast, Birmingham, Bristol, Salford and Sheffield.

The Society is expanding its web programme, so that people can access information and give feedback to us, regardless of where they are. The Society now reaches a wide audience through five websites, each with its own unique function, such as our new sc.1 website which allows school pupils to take a virtual tour around the Summer Science Exhibition and find out more about the researchers and their work. Our corporate website records more than two million hits per month.

However, the Society is keen to hold more activities outside London and draw upon the strengths of the UK's individual regions. We have submitted a bid through the spending review for an additional £250k per year from 2003–04 for an enhanced programme of regional events. These will include an expansion of the activities of the "Science in Society" programme involving the wider public, and measures to engage policy-makers in the devolved assemblies and regional bodies.

12. The Fellowship

12.1 *Election to the fellowship*

The cornerstone of the Society is the Fellowship and our high reputation throughout the world is based on the scientific credentials and eminence of our Fellows (FRS). Throughout our history the Society has promoted excellence and Fellows have included: Isaac Newton, Charles Darwin, Ernest Rutherford, Albert Einstein, Dorothy Hodgkin, Francis Crick and Stephen Hawking. We currently have 65 Nobel Laureates (including two Peace Prize Winners) and Fellows hold many other equally prestigious awards. The main criterion for election as an FRS is scientific excellence.

Unusually for a national academy we do not restrict our Fellowship to British nationals. We draw much more widely and elect Fellows who hold any Commonwealth nationality or Irish nationality as well as non-Commonwealth nationals resident in Commonwealth countries. For those not otherwise eligible, we have a category of Foreign Member. From the foundation of the Society, staff are not eligible for election (or, if already an FRS, have to relinquish their Fellowship).

Fellows of the Society are elected for life and pay a fee for which they are entitled to use FRS, have the right to vote, to serve on the Council and to participate in electing new Fellows. All other aspects of the Society's work are open equally to non-Fellows and Fellows.

The number of new nominations made in any year is unlimited. The nominations process was made easier last year by reducing the number of signatures required on a certificate of proposal from six Fellows to two (one proposer and one seconder) because it was felt that the larger number of signatures might discriminate against women, those in minority subjects or those in places with few existing Fellows. In addition, the

President now writes to Vice-Chancellors and Heads of Research Councils to encourage them to put forward names, especially of women, and the Society undertakes to find a nominator and seconder. Furthermore, the Society has broadened the scope of candidates to encourage nomination and election of scientists, technologists and engineers whose major contribution to their subject has been other than through original research, for example by association, leadership or furtherance of science in a senior managerial or administrative capacity, or through science communication.

The election process is extremely rigorous and is based on the scientific system of peer review. There are 10 subject committees (Sectional Committees) with a chair (currently two of whom are women) and up to 14 members. The membership of these changes entirely every third year by rotation to try to eliminate as far as possible any bias. Each candidate is considered by the relevant committee on the basis of a full curriculum vitae, a research resumé and their best scientific papers. Independent references are sought for those short-listed. Each committee submits its final short-list to the Royal Society Council (which is itself elected) which draws up a final list of up to 42 names for FRS and six Foreign Members, which is put to a ballot at a general meeting of the Fellowship. In any one cycle of elections 113 Fellows plus 21 Council members are involved in the sectional committee process. Candidates can remain on the list for seven years. If not elected in that time they can come back on the list after a break of three years and remain for a period of three years.

12.2 *Profile of the Fellowship: age*

Fellows of the Royal Society are elected for life and the current Fellowship includes candidates who have been elected over the last 55 years (eg it includes a Fellow who was elected in 1946). There is no limit on the number of Fellows at any one time. However, the number of new Fellows elected each year is limited to no more than 42. As there are currently 1,203 Fellows, this means more than half were elected more than 15 years ago.

About 60 per cent of current Fellows are age 65 or older. The average age of Fellows on election in recent years has been 55, which means that typically scientists are elected between their late forties and late fifties, although the current Fellowship includes one who was 29 years old when elected. Fellows are usually elected on the basis of work undertaken some time previously, since it can take a considerable period to build up a sufficient body of scientific work to justify election and to demonstrate whether the scientific work is indeed seminal. Thus current elections reflect the position in science at postdoctoral level in the 1970s and at professorial level now, and the Fellowship as a whole reflects the evolving profile of professorial academic staff over the last half century. In view of the small number of Fellows elected each year, the profile of the Fellowship changes only very gradually in response to changes at professorial level in universities.

12.3 *Profile of the Fellowship: gender*

We have currently 1,203 Fellows, of whom 44 (3.7 per cent) are women. The proportion of women in the Fellowship is increasing slowly. Of 357 Fellows under 65 years of age and living in UK, 16 (4.5 per cent) are women. Of the 96 new candidates nominated for election to the Fellowship this year (2001–02), 11 (11.5 per cent) are women. Between 1990 and 1999, an average 8.4 per cent of male candidates and 9.5 per cent of female ones were elected. Thus women candidates are slightly more likely to be elected than men.

The only direct analogue of the Royal Society in the UK is the Royal Academy of Engineering (RAEng), whose Fellowship includes 1.3 per cent women. Women constitute 3.5 per cent of the Fellows of the Royal Society of Edinburgh in scientific disciplines. Learned societies have Fellows, and although these are not elected in the same way as those of the RS and the RAEng, it is worth noting that for example 3.3 per cent of the Fellows of the Royal Society of Chemistry and 2.5 per cent of the Fellows of the Institute of Physics are women.

It is also difficult to compare our Fellowship with overseas organisations because many overseas academies include social sciences and some include clinical subjects. Of those not including social sciences and the humanities, the representation of women is as follows:

Academy	*Number of Fellows*	*Number of female Fellows*	*% female Fellows*
Australian Academy of Science	311	13	4.2
Indian National Science Academy	719	26	3.6
Royal Society of Canada (Science only)	919	51	5.5
Royal Swedish Academy of Sciences	1,725	107	6.2
US National Academy of Sciences	347	19	5.5
French Academie des Sciences	139	5	3.6
Royal Society of London	1,203	44	3.7

However, it remains true that the number of women Fellows in the Royal Society is disappointingly low and reflects the under-representation of women at senior levels of science in higher education and industry.

According to the Higher Education Statistics Agency, of 7,317 full-time and part-time professors in science subjects at UK universities in 2000, 654 (8.9 per cent) were women. However, this overall total masks large differences between subjects. For instance, if nursing and paramedical studies are excluded (women constitute 57.1 per cent of professors in nursing and paramedical studies), the proportion of women professors in science subjects falls to 7.6 per cent. For comparison, 7.9 per cent of the new Fellows of the Royal Society elected since 1999 have been women.

Therefore, the proportion of female Fellows now elected reflects the small percentage of female professors in university science subjects from which Fellows are elected. Although the under-representation of women is more acute in science disciplines, it is a serious problem at senior levels across the whole higher education sector.

12.4 *Profile of the Fellowship: regional distribution*

Of 1,203 Fellows, 873 are based in the UK and Eire, and 93 are not currently affiliated to any institution or organisation. The distribution of the 684 in universities (including holders of emeritus posts) is as follows:

Universities	*Number*	*% of Fellows in UK*	*% of all Fellows*
Cambridge	152	17.4	12.6
Oxford	111	12.7	9.2
London	141	16.2	11.7
England: other	219	25.1	18.2
Scotland	43	4.9	3.6
Wales	14	1.6	1.2
Northern Ireland and Eire	4	0.5	0.3

Altogether, Fellows are based at 45 universities in the UK and Eire, with the largest numbers outside London, Oxford and Cambridge being at the University of Edinburgh (28), University of Bristol (27), University of Southampton (17), University of Sussex (16), University of Leeds (15) and University of Manchester (14). The remaining 96 (11.0 per cent of Fellows based in the UK) are based in charities (eg Cancer Research UK), other academic institutions (eg MRC Laboratory of Molecular Biology) and companies (eg Microsoft Research UK Ltd).

The Society believes that the distribution of Fellows reflects concentrations of world class researchers at the universities of Oxford and Cambridge and the colleges of London. For instance, of 17 UK Nobel Laureates in Chemistry, Physics and Physiology or Medicine in the UK, seven (41.2 per cent) are based at these three institutions, compared to 46.3 per cent of UK-based Fellows of the Royal Society.

12.5 *Profile of the Fellowship: ethnicity*

The Royal Society does not monitor for ethnicity, but as it elects Fellows from throughout the Commonwealth (including Commonwealth nationals wherever they are resident and non-Commonwealth resident in Commonwealth countries), as well as Foreign Members, the Society's Fellowship draws from a diverse ethnic base.

There is no official comprehensive record of the ethnicity of UK higher education staff in UK universities. However, a study of a sample of 6,355 professors in science subjects carried out by the Higher Education Statistics Agency found that 6,135 (97 per cent) classified themselves as of white ethnicity.

12.6 *Contribution of the Fellows to the Society*

In contrast to academies overseas, where some even pay their Fellows a stipend, Fellows of the Royal Society have to pay a contribution. It is currently set at £164 pa (with reductions for aged over 65), which entitles them to vote, serve on Council, etc. This provides an income of about £150k pa for the Society. Moreover, the President, Vice Presidents and other Fellows contribute enormously to our activities, giving their time willingly and without remuneration for the public good. Since they are generally the world experts in their field and have substantial experience of public life, this represents a priceless asset for the Society and, indeed, for the UK scientific community. Fellows serve on committees, organise and give lectures and scientific meetings throughout the country, advise on and write much of the Society's output of expert advice, represent UK science at home and overseas, display and explain their science to general audiences and perhaps the most onerous and least exciting activity: help with the peer review of the Society's publicly and privately-funded grants and fellowship programmes. This resource provided by the Fellows is one of the reasons why the Society can undertake such a wide range of activities, so efficiently and effectively. There is, of course, much expertise outside the Fellowship, and the Society benefits greatly from the willingness of those outside the Fellowship no less than those inside to give of their time and experience.

13. Governance and Finance

13.1 *Governance*

The Royal Society is a Royal Chartered body and a registered charity whose trustees are The Council. The Council, comprising twenty-one Fellows, including a President and four Vice-Presidents, is elected annually by the Fellowship. There is a full-time secretariat headed by the Executive Secretary who is the Accounting Officer for the Parliamentary Grant-in-Aid (PGA).

Under the overall supervision of Council the Society's policy is determined by the Strategy Policy Board, comprising the President, Vice-Presidents and Executive Secretary. Its finances are overseen by the Finance and General Purposes Committee chaired by the Treasurer. There is an audit committee and an investment advisory committee both of which have non-Fellows as members. The Society's accounts are produced according to the requirements of Charity Law and follows the Statement of Recommended Practice that are endorsed by the Charity Commission. They include a separate account for the PGA. They are externally audited and the Society also has internal auditors. Apart from minor out of pocket expenses (usually travel) none of the Trustees received any remuneration from the Society.

13.2 *Finance*

The Royal Society derives its income from several sources, the most notable of which is its Parliamentary Grant in Aid (PGA) which comprises 66 per cent of the Society's annual budget and is designed to fund specifically identified programmes which are detailed in the Royal Society's bid to the spending review. These bids are submitted through the Office of Science and Technology (OST) and the Society is subject to the same disciplines as other publicly funded bodes such as the Research Councils. This includes detailed discussions of the Society's programmes with them, the monitoring of expenditure and compliance with government expenditure processes. As the PGA is provided for specific purposes agreed with OST, any substantial changes in the allocation of funds between programmes must be agreed with OST. The Royal Society keeps in close touch at both policy and working level with OST officials who meet staff quarterly to review progress on PGA funded programmes and other matters of common interest.

The Royal Society is also funded from its own private resources that include income it generates itself, notably from its endowment and its publications. Additional income is provided by grants, donations and gifts from trusts, foundations, companies and private individuals. In many cases this income from donations and gifts represents income that would not otherwise enter the UK science base. In a similar way to PGA most of these resources are only available for specific initiatives.

In broad terms for 2001–02 the Royal Society's income was £39.087 million and its expenditure was £36.184 million.

A breakdown of expenditure by programme is given in Appendix 8.

13.3 *Raising funds from non-government sources*

It has been our policy over many years to devote as much of our resources as possible directly to supporting UK science and scientists. In addition, in 1998, we launched a major fundraising campaign "Project Science" systematically to raise additional funds from non-governmental sources to fund scientific programmes. To date over £36.6 million has been pledged from private companies, corporations, trusts, foundations and Fellows of the Society.

The Society is able to raise this money because of its substantial record and reputation as the world's premier scientific academy, its relentless pursuit of excellence and the confidence engendered by the knowledge that the UK government trusts it to administer a major annual grant so efficiently, effectively and economically. Perhaps the best example of this is the research merit awards scheme where £2 million of government money has attracted £2 million from Wolfson Foundation on the understanding that the Royal Society would administer the scheme. These private funds have had a significant impact on the UK science base.

13.4 *Direct expenditure from private sources*

In the financial year 2001–02 the Society's budget anticipates a direct spend of £10.2 million in support of science, engineering and technology from private sources. The major proportion (£6.3 million) supported research scientists in universities including five professors, 16 research fellows and 17 industry fellows. The Society has raised money for 20 Dorothy Hodgkin fellows, which are aimed especially at encouraging women to remain in scientific careers. £2 million is devoted to the research merit awards to match the £2 million from government, £2.4 million was spent on encouraging the creation of the new research facilities within existing university buildings and the Society inaugurated the Brian Mercer Innovation Awards aimed at taking important scientific discoveries through to commercial exploitation.

In support of international scientific collaboration, the Society spent £1.72 million to support over 100 postdoctoral fellowships, visiting professorships and joint projects.

The Society has recently increased its activities aimed at encouraging better science education and communication with the public on scientific issues. With a grant from the Kohn Foundation of £1 million it has set up a new Science in Society programme and with grants from various trusts and corporate sources has expanded its education programme, including a grants scheme to put our best scientists in schools, to produce policy studies on science and maths and to produce educational resources for post-16 students. Total expenditure on these activities amounted to £1.1 million. The majority of the Society's science advice is funded privately amounting to over £200k pa in 2001–02.

All the above figures exclude staffing and overhead costs.

13.5 *Indirect expenditure from private sources*

The Royal Society's work leverages substantial additional funds into the science base in the UK that do not pass directly through the Society's books. Some are easy to quantify such as the Royal Society's Leverhulme programme which has just been renewed for a further four years with expenditure of £213k pa and the COPUS book prize which attracts sponsorship of approximately £200k. In 2001–02 our international exchange programme attracted £4.9 million from our partner academies and equivalent organisations countries throughout the world. Our support for Academia Europaea attracts £235k pa to that organisation and we have leveraged £75k from other European academies for the secretariat of the new European Academies' Science Advisory Council that is based at the Royal Society.

In addition, we estimate that our 420 research appointees attract some £115.3 million over and above that provided by the Royal Society. This is based on a survey of 250 URFs when 124 received Research Council funding at an average of £288k per person; seven received EU funding at an average of £80k per person and 109 received funding from other sources at an average of £297k per person.

Equally important is the support we receive from Fellows and from a whole range of other scientists and individuals who support our peer review processes, sit on committees, give internal and external lectures etc all without payment. Recent high profile non-scientific lecturers have included the playwright Michael Frayn and the artist David Hockney. It is impossible to quantify this support in its entirety but for peer review alone (given that the research councils pay an honorarium to their peer review panels) this represents support equivalent to over £40k pa.

Thus the total amount the Society (including its research fellowship award holders) are able to call upon for 2001–02 from non PGA sources is £10.28 million direct expenditure, £723k third party expenditure and over £115.3 million indirect expenditure.

14. ADMINISTRATION

14.1 *Management*

The Royal Society currently employs 125 members of staff (15 of whom are on fixed-term contacts), headed by the Executive Secretary who is appointed by Council. The Statutes specify that the Executive Secretary must not be a Fellow of the Royal Society. He or she acts as Accounting Officer for the Society's Parliamentary Grant-in-aid. The Executive Secretary is supported by a Senior Management team of 12 (five of whom are women).

The Royal Society has a three-year business plan that provides a framework within which the Society operates. The plan, which is approved by Council, outlines our mission and objectives. The implementation of the plan is reviewed on a quarterly basis. In addition we review our programmes from time to time, the most recent being the review of the international programme completed in February 2002 by Ms Helen Meixner.

14.2 *Minimising operating costs*

As a distributor of public money, the Society continually seeks to use its resources in the most effective way. In 1992 the proportion of the grant devoted to administration was 18 per cent by 1998 this was 9 per cent and in 2001–02 this has reduced to just under 6 per cent. On the currently agreed budget for 2002–03 it will further reduce to 5.6 per cent Over the last three years the Society has modernised its administration and financial control. It has installed a new financial and management information system at a cost of £250k from its own resources, it has completely redeveloped its databases for the administration of its grants at a cost of £100k again from its own funds and it has completed a pilot project to completely automate its grant application and processing system which will be operational in 2003. In the last three years it has invested over £300k of its own resources in IT infrastructure. These initiatives have allowed a substantial increase in the activities of the Society despite a steady reduction in the charges made to the PGA for operating costs. This represents both an increase in our cost efficiency and a partial subsidy of PGA operating costs from our private funds.

We will continue to investigate ways to administer the PGA in the most cost effective manner possible while ensuring we do not compromise our ability to provide the level of staff support to recipients of our fellowships and other awards that is a key feature of our schemes.

14.3 *The Society's premises—a resource for the scientific community*

Most developed countries and many developing countries have established academies of science and many have been modelled on the Royal Society it being the oldest academy in continuous existence. The majority of these academies are supported by their governments, in recognition of the importance of their role in the development and promotion of science. This support usually includes the provision of accommodation. In the case of the Royal Society, such support was first provided in 1778 when the government notified the Society that it was prepared to provide it with accommodation rent free in Somerset House, its third home since its formation. In 1856 the government purchased Burlington House to accommodate a number of scientific societies and the Treasury gave it to the Society in place of Somerset House. In 1963 the Chancellor of the Exchequer announced in Parliament that the Royal Society had been offered a 99 year lease on 6-9 Carlton House Terrace (its current premises) and that the Treasury would be responsible for paying the rent (currently £306k per annum plus external redecoration costs).

The Royal Society's premises provide a facility in the heart of London, for the entire scientific community for conferences, exhibitions, lectures, seminars and meetings. The Society welcomes conferences on science, science policy and science education as well as events and meetings of an educational and charitable nature. The building is currently used by many external organisations including learned societies, research councils, universities, government departments and NGOs. Our own use of the facilities ranges from international scientific discussion meetings, public lectures and the Summer Science Exhibition through to training courses for postdoctoral scientists in media and communication skills. In 2001 we held over 1,800 meetings with a total attendance of 67,000. We are unable to meet the current demand for space in the building and as a result we have embarked on an ambitious re-development project of our premises funded entirely from private sources. The redevelopment will offer substantially improved facilities and additional meeting rooms for the UK and international scientific community and will be paid for from a fund raising campaign that the Society has mounted. It will not be a charge on public funds.

15. Future Priorities for the Royal Society

15.1 *Background*

The positive outcome of the last spending review for the science base in the UK, together with our success in raising substantial private funds for our work, has markedly strengthened our ability to support the best young scientists and engineers undertaking world class research.

The bid which we submitted to OST for the next spending review is based on the four objectives of ensuring:

- UK science has access to and benefits from the most talented scientists and engineers
- the UK improves its international competitiveness by having access to the best researchers
- closer and more meaningful interaction between scientists and the society at large
- equality of opportunity for women in science and engineering

The Society's spending priorities remain: to extend support for the brightest and best researchers, increase opportunities for women to remain in science, strengthen international programmes, promote dialogue between scientists and the public, make science education both exciting and meaningful to young people and enhance our science policy work.

15.2 *Extending research support*

Our main programme is support for 310 URFs and 37 DHFs, which together account for over 50 per cent of our public funding. The recent (April 2002) Roberts Report recommends an increase in the number of post-doctoral fellowships like the Society's URF scheme. The calibre of applicants for both programmes remains extremely high and success rates exceptionally low at 14.6 per cent for URF applicants and only 5 per cent for DHFs. It is clearly possible to increase the number appointed without reducing quality. We therefore propose that the total number of URFs in post should rise progressively to 350 and DHFs to 80 which would result in success rates rising to 20 per cent and 10 per cent respectively. The cost would be £3.36 million in a full year for which there is currently no budgetary provision.

Our research grants provide seed-corn funding for innovative, blue-skies projects that is rarely available from other funding bodies. The budget for this scheme fell at the last spending review and the success rate is now below 25 per cent with the Society having to reject many very good applications. We have bid to reinstate the funding back to the 1999–2000 levels.

15.3 *Increasing Opportunities for women*

The Society was one of the first to encourage the progression of women into senior scientific positions with the creation of the Dorothy Hodgkin Fellowship (DHF) scheme. We have continued this leadership role by supporting a programme using our own funds and those donated by industry to examine what further we could do to promote women in science. We wish to expand our work in this area and we have bid to OST for support for two new initiatives. The first is a major new scheme to promote career mobility of people in science, engineering or technology. It would provide transitional funding to relocate to a new research institution, where the move is necessitated by a spouse or partner moving their workplace beyond a reasonable commuting distance. The scheme will cover salary and research expenses for up to two years as a foundation for long term career development and will be a partnership between the Society and the institution accepting the researcher. In addition, the Society wishes to provide a modest level of support for the best practice guides produced by the "Athena project" (a network of women in higher education). The additional cost of both these proposals is £435k in 2003–04.

15.4 *Developing industry/academic links*

The Society's industry fellowship scheme, which is supported not only by the PGA but also by the research councils and industrial sponsorship, promotes collaboration between academic scientists and engineers and their industrial counterparts. A recent review of the scheme has demonstrated what substantial benefits this scheme brings, including 17 potential new products, two patents, one spin out company and 10 other exploitable intellectual property items: major outcomes from a relatively small scheme (36 research fellows since 1995). Given its success we have bid to OST for an expansion of this scheme from nine a year to 18 a year, at an additional cost of £200k. The Roberts Report has subsequently recommended an increase in the number of industrial secondments "as the basis for encouraging postdoctoral researchers into industrial careers and as a mechanism for knowledge transfer".

15.5 *International*

On the international side, it is clear that the UK remains one of the preferred destinations for postdoctoral scientists from overseas but the opportunities for the best and brightest to come here are limited. As part of our policy of bringing the world's best researchers to the UK, the Society has just started a new scheme, widely welcomed on both sides of the Atlantic, to encourage young American researchers to spend time at UK institutions and we wish to extend this scheme to other countries of scientific strength by offering additional awards at a cost of £1 million in a full year.

15.6 *Regional*

The Society intends to step up its regional activities. Subject to a successful spending review bid, we will introduce a mixed programme of lectures, debates, academic seminars and meetings with policymakers and expand our regional science in society activities (currently funded entirely from private sources) aimed at enhancing confidence in science. It is anticipated that this programme will allow the Society to take a more active role in regional scientific issues and to provide regional leadership. The cost of this programme will be £250k. We have reviewed the grant given to the Royal Institution and with the changes it has introduced we are confident that this represents good value so we have asked OST for additional funding to enhance their science education programme aimed at school aged children.

15.7 *Science policy*

The Society's science policy work has been gradually extended over the past five years to the position that many organisations, government included, see our output as authoritative, definitive and independent. The pressures on the Society to contribute to science policy debates continue to increase and the Society is presently undertaking one of the three enquiries that government has set up following the foot and mouth outbreak. In addition, this year we have been leading an attempt to create a more effective European science policy voice with the creation of the European Academies Science Advisory Council (EASAC). We have bid to OST for a modest increase in funding to allow us to continue this leadership role especially in Europe.

In summary, the costs of the areas where the Society would like to increase its support are:

Scheme	*£k*
URF and DHF	3,360
Relocation fellowships & Athena	435
Industry fellowships	200
International fellowships	1,000
Research grants	650
Other	330
TOTAL	5,975

16. CONCLUSION

The Royal Society makes a substantial contribution to keeping UK science competitive with the best in the world. Our unique attributes include the Fellowship of 1,200 of the most outstanding scientists in the UK and the Commonwealth, the extensive network of younger scientists who hold our awards and are connected with the Society in other ways, our focus on supporting scientific excellence irrespective of discipline, and our independence of government and vested interest. We use these attributes in imaginative and creative ways to promote science. The money we receive through OST constitutes just 1.6 per cent of the science budget, but it has a powerful catalytic impact on UK science as a whole. Coupled with our private sources of income and the flexibility we have in deploying them, it enables us to anticipate and respond to the needs of UK science and thus to promote the well-being of the UK.

April 2002

Glossary

The following is a list of abbreviations and definitions for some of the terms used in the text.

ACME	Advisory Committee on Mathematics Education
ALLEA	European Federation of National Academies of Sciences and Humanities
Athena Project	a UK wide initiative to advance women in science, engineering and technology in higher education by working with institutions to develop, share, encourage and disseminate good practice (more information at: http://www.athena.ic.ac.uk)
AWiSE	Association of Women in Science and Engineering
BAAS	British Association for the Advancement of Science
COPUS	The UK Partnership for Science Communication
DfES	Department for Education and Skills
DHF	Dorothy Hodgkin Fellowship/Dorothy Hodgkin Fellow
EASAC	European Academies' Science Advisory Council
Fellow	an individual elected to the Fellowship of the Royal Society and paying a subscription
fellow	holder of a post, usually for research, in academia or industry that is partly or wholly funded by the Royal Society
FRS	Fellow of the Royal Society
IAC	InterAcademy Council
IAP	InterAcademy Panel
ICSU	International Council for Science
k	thousand
m	million
NAPAG	National Academies Policy Analysis Group
OFSTED	Office for Standards in Education
OST	Office of Science and Technology
pa	per annum
PGA	Parliamentary Grant-in-Aid
post-docs	post-doctoral researchers
QCA	Qualifications and Curriculum Authority
RAEng	Royal Academy of Engineering
R&D	research and development
RS	Royal Society
Science	the collection of disciplines including medical, agricultural, biological, physical, chemical, mathematical and engineering sciences, applied sciences and technology
science base	the staff, students, infrastructure and equipment engaged in scientific research across all of academia and industry

SET	science, engineering and technology
SORP	Statement of Recommended Practices
URF	University Research Fellowship/University Research Fellow
WES	Women's Engineering Society
WISE	Women into Science and Engineering

Appendix 1: Research Fellowships and Direct Support Schemes in the UK

Schemes funded from both PGA and non-PGA sources

University Research Fellowships (URF) allow scientists with the potential to become leaders in their chosen fields to spend up to 10 years concentrating solely on "blue skies" research. Up to one year can be spent abroad. Award provides salary and research expenses. Additional support includes workshops, individual career advice, student bursaries, media and communication training. 322 URFs in post (310 from PGA). Scheme makes a significant contribution to both reversing the "brain drain" with approximately 30 per cent of URFs returning from abroad to take up these awards and to "brain gain" by attracting scientists from elsewhere in Europe. Current URFs include Dr Neil Ferguson who was awarded the OBE for his work on foot and mouth disease and Dr Andrew McKenzie winner of the Institute of Physics Mott Prize.

Dorothy Hodgkin Fellowships provide salary and research expenses for up to four years at early stages of postdoctoral career when many academics (particularly women) leave science. Flexibility in funding supports maternity leave and periods of part time working. Additional support and advice is provided by personal mentors such as Baroness Susan Greenfield (Professor of Physiology at Oxford University). Additional support includes individual career support, student bursaries, media and communication training. 55 fellows in post (37 from PGA), 52 of whom are women. We intend to secure additional sponsorship for this scheme from corporate sponsorship and other sources. Current holders include Dr Susan Howson (University of Nottingham) the first female recipient of the Adams Prize, the UK's most prestigious award for a young mathematician.

Industry Fellowships promote innovation and collaboration between academic and industrial scientists by allowing academic scientists to work in industry and vice versa for between six months and two years (FTA). Provides salary and collaborative costs. 16 fellows currently in post (nine from PGA). Following the successful evaluation of this scheme we propose to increase this number to 17.[12] Fellowships have resulted in seven new products under development including a jet engine and a new anti-infective agent.

New Relocation Fellowships* will facilitate the relocation of excellent scientists whose spouse or partner is moving their workplace beyond reasonable commuting distance. These awards will provide salary and research expenses for up to two years and will be of particular benefit to women who are more often the "following partner". They are part of our wider programme of activities aimed at retaining women in science (see Section 7).

Wolfson Foundation/OST Research Merit Awards enable universities to compete with industry and overseas universities for the "David Beckhams" of science. Provides salary enhancement and additional research expenses for five years. Currently 17 in post. "Brain gains" include Prof Peter Taylor who left the University of California to work on molecular structures at University of Warwick and Dr Gabriel Aeppli who moved from Princeton to work on quantum physics at University College London.

Research Professorships attract and retain the world's top scientists in the UK. Provides enhanced salaries and generous research expenses for 10–15 years. 17 Professors in post (12 from PGA). Current holders include Professor Frances Ashcroft FRS who works on the structure, function and physiological roles of ion channels and Sir Martin Rees FRS, Astronomer Royal. In addition to scientific research, previous award holders such as the Nobel laureate Sir Harry Kroto FRS have been extensively involved in increasing the accessibility of science to the public.

Research grants provide seed-corn funding of up to £10k for innovative, blue-skies projects. Rarely available from other funding bodies and particularly effective in funding "high risk" projects and pilot studies. Approximately 270 grants each year with the intention to increase this to 314*. Recent awards range from the development of a vaccine for contagious bovine pleuropneumonia from wheat flour to an investigation of particle size segregation in granular avalanches.

Conference grants promote UK science abroad by providing up to £1.5k for UK scientists to participate in prestigious conferences throughout the world. Enable scientists to communicate their findings, establish collaborations and build international reputations. These grants include a contribution to childcare costs for conference participants. Approximately 1,100 grants each year with the intention to increase this to 1,250*.

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* Subject to a successful Spending Review bid.

Schemes funded from non-PGA sources

Wolfson Refurbishment grants of up to £250,000 are available for the renovation and modernisation of university research laboratories.

Brian Mercer Innovation Awards were established to fill the funding gap between the scientific research and the exploitation of the idea through venture capital. Major grants of up to £250,000 are available for innovative proposals that take a project forward from concept to prototype. The small grant scheme for younger scientists offers funding of up to £30,000 to enable important discoveries to be taken through to commercialisation.

Leverhulme Trust Senior Research Fellowships seek to provide opportunities for academics to be relieved of all their teaching and administrative duties, for a period of between one academic term and one year to do full-time research, in order to re-establish their research career as a foundation for long-term future development. Universities are required to recruit a member of staff to replace the award holder.

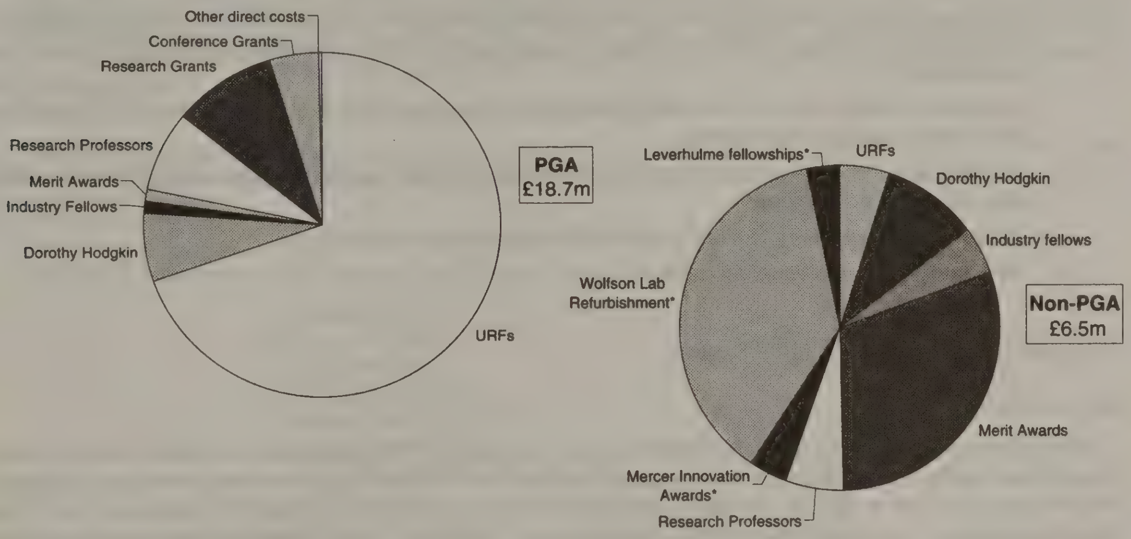

Figure 1. Budget expenditure for financial year 2001–02 for research fellowships and direct support schemes in the UK (excluding administration costs). Schemes marked with * are funded entirely from non-PGA funds.

APPENDIX 2: OUTCOMES OF ROYAL SOCIETY INDUSTRY FELLOWSHIPS (1995–2001)

Aims of the scheme

To promote the exploitation of research

To improve co-operation between industry and HEIs.

To increase knowledge transfer from academia to industry and vice versa,

Outputs

36 Industry fellowships completed since 1995, 23 supported in the current financial year:—

The RS (£200K from PGA), BBSRC, EPSRC and Rolls Royce plc (£300K). Total funds = £500K

Outcomes

(i) Exploitation of research

- New products under development (seven)
- Potential products that may be developed (10)
- Patents (two)
- Spin out companies (1 set up and another under consideration)
- Other exploitable intellectual property (10 items)

Types of novel products under development include mathematical methodology, software and algorithms, a new design of aircraft generator capable of operating over a wide range of speeds, better ways of making improved varieties of sugar beet and a possible new anti-infective drug.

(ii) Increased co-operation between academia and industry

- On-going collaboration (88 per cent of respondents said the collaboration was continuing)
- Increased company funding in the IF's area of research (nine)
- Research funding (£3 million from public funds, £812K from industry and 250 from a charity)
- Formal contracting of research by industry to the HEI department (seven research contracts)
- CASE Studentships (eight)
- Academic IF became consultant to a company (six), two became members of the company's board/scientific board, one became a director of the company
- Academic IF became a company employee (two)
- Company IF became visiting professor in the academic department (one)

(iii) Increased knowledge transfer

- Increased understanding of how the commercial research sector operates (93 per cent of academics holding IF in industry considered they had gained new insights into how commercial research is undertaken)
- Increased understanding in the HEI department of the needs of industry as employers of people in SET (48 per cent of respondents)
- Original research papers in peer-reviewed journals (51) and conference proceedings (83), 13 other miscellaneous publications
- Talks (42 talks given by IFs in the host HEI department or company)
- New undergraduate teaching modules (six)

APPENDIX 3: EVALUATION OF URF SCHEME

Introduction

The University Research Fellowship (URF) Scheme was set up in 1983 responding to concerns about a lack of opportunities for the recruitment of able young academic staff to university positions. As well as helping to keep the best scientists in the UK, the fellowships have evolved to attract top young European scientists. The scheme is designed to provide medium-term, high prestige fellowships for outstanding postdoctoral scientists and to encourage young academics to stay in or return to the UK. The objectives of the scheme are:—

- to make medium-term awards to outstanding postdoctoral scientists on the basis of individual merit
- to provide them with a stable and helpful environment in which to undertake high quality research and establish a reputation as a research scientist
- to encourage them to stay in or return to the UK — slowing down/reversing the "brain drain"
- to allow them time to gain teaching experience and to build up contacts and collaborative links
- to keep close contact with them and assist them, where possible, with career guidance
- to ensure that, before the end of the fellowship, they have secured a permanent post, preferably in a UK university, but certainly somewhere where their skills and experience can be put to good use for the benefit of science.

The first questionnaire-based survey of former URFs was conducted in 1993. The exercise has since been repeated annually and a total of 295 former URFs have now completed the questionnaire (a response rate of 80 per cent). They have provided their views of the scheme and have given information about their career progression.

Analysis of results

Pre- and post-URF career progression

It was found that most respondents had held one or more short-term research positions in the UK or overseas before taking up their fellowship (Figure 1). 26 per cent of respondents had returned from overseas to take up the URF and 52 per cent had previously held a position abroad.

Figure 3.1: Number and location of short-term research positions held before URF

1 UK	74
1 UK/1 Overseas	57
1 UK/2 Overseas	12
1 UK/3 Overseas	5
1 UK/4 Overseas	1
2 UK	56
2 UK/1 Overseas	19

2 UK/2 Overseas	6
3 UK	22
3 UK/1 Overseas	1
4 UK	5
4 UK/1 Overseas	2
5 UK/1 Overseas	1
1 Overseas	11
2 Overseas	10
3 Overseas	1
Temporary Lectureship	6
Assistant Professor (USA)	3
Demonstrator UK	1
None	2

According to 175 respondents (59 per cent) the main reason they applied to the scheme was to be able to do full-time independent research in a secure environment. Other reasons included the expectation that the URF would lead to an established post (19), the prestige of the scheme (32) and the opportunity to return to UK science (18).

For the vast majority of respondents the main reason for resigning a URF was to take up an established post — 92 per cent of these positions were within the UK higher education system. Figure 2 shows the type of post taken up.

Figure 3.2: Main reasons for leaving URF scheme

Lectureship UK	152
Readership UK	27
Tenure expired	22
Professorship UK	20
Senior Lectureship UK	12
Professorship USA	10
Senior Research Associate UK	10
Industry UK	10
Lectureship Overseas	7
Other	6
Assistant Lectureship UK	5
Research Council/Institute position	4
Professorship Overseas	2
Snr Research Fellow Overseas	2
Industry overseas	2
University Administration	1
Return to medicine	1

Since 1993, the average length of tenure had increased from 4.5 to 7.1 years. This trend may reflect an increasing scarcity of posts in universities, a desire by universities to hold onto Royal Society funding for longer before absorbing the fellow into their established staff or the outstanding research opportunities provided through these unique awards.

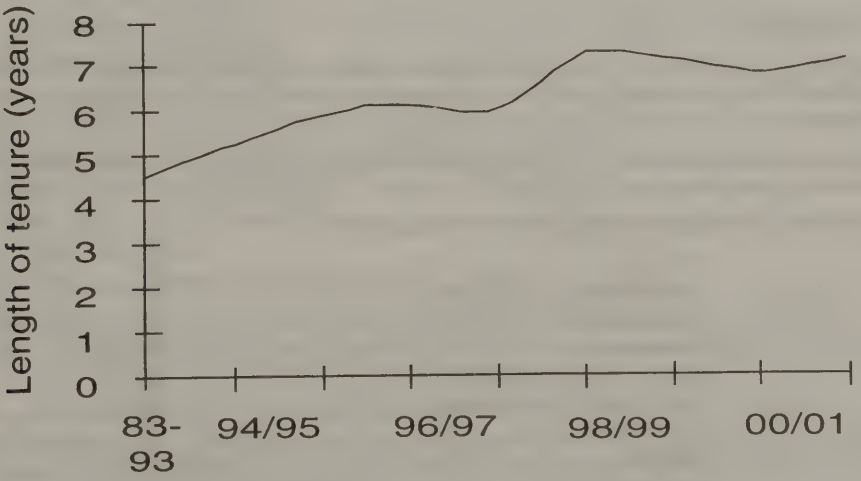

Figure 3.3: Graph to show average length of tenure

3. *Transfers between host Universities*

Although many remained at the same institution throughout their fellowship, the numbers of URFs transferring their fellowship to a new university had increased in recent years. Of those who left the scheme in 2001, seven out of 30 had transferred at some point during their fellowship. In most cases those who transferred did so as part of their negotiations for an established position with the new institution. The possibility of transferring for a short time ahead of taking up an established post is most appreciated.

> "I transferred to provide time to settle in at Imperial College before taking up my lectureship"
>
> "The one year transfer to Newcastle was most helpful and allowed me to establish my research at the new institution"

4. *Advantages of the Scheme*

Respondents were asked to identify the strengths and weaknesses of the URF scheme (Figure 4) and were able to give more than one reply in these sections. 175 thought that the main advantage was that the URF offers a longer term appointment than most schemes at a similar level and therefore provides more security. 95 respondents stated that the research expenses received from the Royal Society were a definite bonus and 99 mentioned that the high profile of the scheme was advantageous when applying for permanent positions.

Figure 3.4: Table to show advantages of the scheme in order of preference

Length of tenure/security	175
Prestige/high profile	99
Research expenses	95
Independence	91
Flexibility	38
Little teaching/administration	32
Good support from Royal Society	31
Minimal bureaucracy	25
Eligible for other grants	22
Better salary	11
Better prospects	7
Spending time abroad	5
Contacts with other URFs	4
Able to obtain teaching experience	3
Broad subject area	3
National scheme	1

5. *Disadvantages of scheme*

Nearly three-quarters of respondents stated that they were unable to identify any disadvantages of the scheme compared with other fellowships to which they would have been eligible to apply. The main criticism raised by the others was that a URF may hold up subsequent promotion as "progression up the career ladder is essentially frozen" while holding a fellowship. Some had had difficulties within their department with regard to their status compared to other staff, and a few regionally based URFs commented that they had felt rather isolated.

6. *Research Expenses*

Since the start of the scheme the amount of annual research expenses available to URFs has increased significantly from £900 per annum in 1983 to the current level of £13,000 for the first year and £11,000 per annum thereafter.

All respondents stated that they found their research expenses invaluable. Figure 5 indicates the various ways in which they used these funds.

Figure 3.5: Uses of research expenses in order of importance

Travel	183
Small items of equipment	154
Consumables	108
Computers	91
Books/Journals/Reprints	48
Large items of equipment	25
Laboratory costs	11
Visitors	8

> "The flexibility of the use of funds etc. is extremely attractive, as it allows new research and collaboration to commence without undue delay"

More than two-thirds of respondents stated that the amount they received was adequate. Some felt that funds should be available for research assistants and that help should be provided for the purchase of large pieces of equipment.

7. *Relationship between URFs and the Royal Society*

Over the years the Royal Society has helped URFs with career and other advice and has tried to build as much flexibility as possible into the scheme, eg by enabling fellows to spend up to two years at a research institution overseas and by allowing part-time arrangements for those with family commitments.

When asked whether the Royal Society was sufficiently flexible regarding matters such as leave of absence, transfers, requests for extra funding, maternity leave and visits abroad etc, almost all responded positively and said that they had not felt at all constrained during their fellowship. The Society was regarded as helpful, understanding and very supportive. The lack of bureaucracy employed is also very much appreciated.

> "I found the Royal Society very flexible and did not feel constrained in any way"
>
> "I was impressed by the adoption by the Royal Society of flexible schemes for women and found it an immense help . . . through my second maternity leave"

8. *Relationship between URFs and host Institutions*

226 respondents stated that they were treated well at their host institution and were given the same status as established staff. The remainder had had some difficulties in gaining recognition and some had to fight for privileges such as supervision of PhD students, the right to attend staff meetings and bench space. A number of research fellows transferred because of the way they were treated within their faculty. There is perhaps more the Royal Society could do to explain the role and status of URFs to the host department.

9. *Effects of fellowship on subsequent career*

Only one respondent said that his URF had not helped his career and felt that it was a "stop gap" and a "step down" after his previous position in the USA. The rest of the replies were positive and conveyed that the fellowship had been of great benefit since the end of their appointment.

> "If I had not been awarded a URF, I would either be in science in France or the US, or have returned and done a MBA or similar ie left academia"
>
> "Achievement of a URF is taken as a recognition that one has reached serious consideration for a permanent position"

10. *Suggested improvements for the Scheme and future funding opportunities*

Half the respondents had no suggestions to make when asked for ways of improving the scheme. Among the suggestions put forward by the remainder were:

- to increase the number of fellowships available each year. Over the years there has been a considerable increase in the number of posts to a ceiling of 310 in 2001—the number of vacancies each year depends on funds and resignations;
- to offer extra support for research assistants/technicians or students and to continue research expenses for a short time after the URF starts their permanent position;
- to invite competitive bids to fund larger items of equipment which are too expensive to purchase with a research expenses grant;
- to provide more of the available research expenses in the first year to help with start-up costs. The Society's policies on research expenses are regularly reviewed and an increase made to £13,000 for the first year and £11,000 per annum thereafter;
- to ensure a wider distribution of URFs across the country;
- to obtain a definite commitment from the host institution at the start of the fellowship that a post will be made available;
- to provide more senior fellowships to which the URFs can progress;
- to construct a nationwide agreement as to the rights and eligibilities of research fellows. In 1996 the Society signed the Concordat on Research Careers which aims to bring the terms and conditions of short-term staff in line with those enjoyed by established staff;
- to establish a structure whereby URFs can seek advice and assistance from their more experienced peers on the scheme. The Society is now organising seminars for this purpose to be held at various universities throughout the UK. A new website for research fellows will be launched in March 2002 offering the opportunity for on-line discussions with senior scientists;
- to establish a mentor scheme for new URFs;

- to increase URFs salaries in line with the Wellcome Trust;
- to arrange more social events to bring URFs together, either in London or regional.

11. *Conclusions*

The results of the survey are encouraging and helpful. The majority of the respondents found their fellowship an enjoyable and valuable experience and practically all those who have returned the questionnaire said that their subsequent career had benefited significantly from the time spent as a URF. It was generally felt that the scheme:

- offers the right combination of full-time research, independence and flexibility and a good level of research support with little red tape;
- is right to support the talented individual rather than a project or department, especially as this allows research fellows to transfer to a different institution where this is of benefit to their research or career prospects;
- has helped UK academics to return and attracted top young European scientists.

The Society values feedback from its fellows and, as can be seen from paragraph 10, it listens to and tries where possible to respond to the comments received. Clearly, the principal concerns for the Society must lie in improving the relationship between fellows and their host universities and continuing to monitor the need for research support whilst continuing to avoid cumbersome bureaucracy.

APPENDIX 4: INTERNATIONAL EXCHANGES PROGRAMMES

Fellowships are aimed at excellent young scientists and provide an opportunity to spend between six months and two years (three for USA) developing skills and experience by undertaking research in a different country. Approximately 100 awards are made per year covering travel and subsistence. The Royal Society and the partner academy or institution share costs. One of these schemes is the Japan 2+2 fellowships that encourage excellent young postdoctoral UK scientists to spend two years in Japan (a country of scientific strength) and offers two years funding when they return to the UK.

Joint projects provide "seed corn" funding of up to 18k over two to three years to support the early stages of innovative collaborative research between a UK group and one overseas group (predominately Europe, former Soviet Union, China and Japan). They are becoming increasingly popular and a recent review has shown them to be particularly effective in establishing long-term collaborations as well as gaining project funding from other bodies. 130 new Joint Project awards started in 2001–02 providing travel and subsistence. The UK funding is normally matched by our partners.

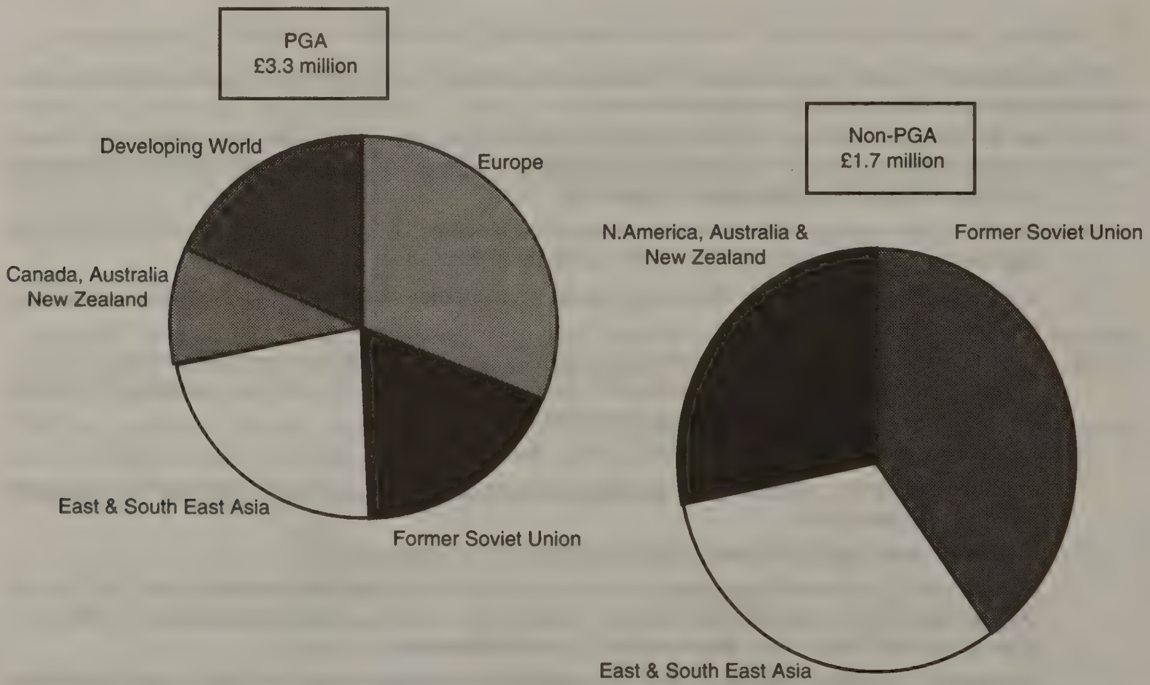

Figure 4: International exchanges budget by geographic region for financial year 2001–02 (excluding administration costs).

Study visits are short-term networking visits, between five days and six months, with the objectives of enhancing the research capabilities of individual scientists, developing international collaborative links and proving access to unique sites and resources. 439 study visits were made in 2001–02 with awards of between £500 and £6000 to cover travel and subsistence. The Royal Society and the partner academy or institution share costs.

"Brain-gain" Fellowships will benefit the UK by funding excellent postdocs from the scientifically strong countries of the US, India and China to work in UK universities and research institutes for two to three years. The first 10 awards for the US scheme will be made this year (funded under the last Spending Review) and similar fellowships will be established with India in China in 2003 and 2004 respectively (subject to a successful Spending Review bid).

APPENDIX 5: SCIENCE EDUCATION PROGRAMMES

Recent examples of education policy advisory activities

The Society has recently published major studies on the teaching of geometry for 11–19 year-olds and school science technicians.

Technicians in schools and colleges

In late 2000, the Society's Education Committee identified a need for work to be undertaken to map the size and distribution of the science technician workforce in schools and colleges. A working group was set up jointly with the Association for Science Education, consisting of 14 members including teachers, technicians and scientists. The group was chaired by Sir John Horlock FRS and included one other Fellow.

The working group undertook surveys of technicians and head teachers, and analysed a sample of OFSTED reports. After considering the results of the research, the working group published a report with recommendations in January 2002. In the three months since publication, 2000 printed copies of the report have been requested (largely by schools) and it has been successfully downloaded from our website over 7,000 times.

In response, the DfES has agreed to set up a joint working group to examine the report's recommendations and to take forward proposals where possible. In addition, a DfES consultation document now includes proposals to use the National Centre for Excellence in Science for the training of technicians as well as teachers.

The contents of the report were also used by several witnesses during the delivery of their evidence to the inquiry into 14–19 education by the House of Commons Science and Technology Committee.

The teaching of geometry in schools and colleges

In February 2000, the Royal Society set up a working group with the Joint Mathematical Council to consider the teaching of geometry to students aged 11–19. The group looked in particular at the "Shape, Space and Measures" strand of the Secondary National Curriculum, representing about a third of the mathematics course.

The final report was well received by the mathematics community when it was published in July 2001. The Society received orders for 2,500 printed copies, including requests for a total of more than 150 from over 30 countries. To date, the report has been downloaded from the Society's website some 3,500 times.

After the report was published, the Government's National Numeracy Strategy (NNS) purchased 300 copies to be used in the training of the Numeracy Consultants. These consultants each gave two training sessions on geometrical reasoning to teachers representing one third of all secondary schools in England. The accompanying course handbook included a summary and extracts from the report.

The NNS plans for next year include preparing a teaching unit on geometrical reasoning, to be presented to representatives of all secondary schools at a training course during the spring term of 2003. It is anticipated that the content of the course will have been heavily influenced by the report.

Partnership Grants Scheme

The Royal Society Partnership Grants scheme encourages teachers to work with professional scientists to create innovative projects for school pupils. The scheme offers individual grants of up to £2,500, to teachers and scientists or engineers to collaborate on activities for 5–16 year-olds. The grants may be used to purchase equipment and materials not normally covered by school budgets, to compensate schools for supply cover if the teachers need to be out of the classroom, and to pay travel costs when teachers, scientists and engineers, and pupils visit each other.

The scheme was launched in November 2000, and over its first three rounds, the Partnership Grants scheme has awarded nearly £170k to 107 schools, giving 11,745 pupils the chance to work with a scientist or engineer. Schools who might be considered in greatest need of this support are benefiting; over half the schools supported have been at primary level and 95 per cent are in the state sector.

The scientists/engineer partners are drawn from both the public and private sectors, with 40 per cent being based in industry. On the basis of the evaluation forms received so far, there appear to be many benefits for pupils, teachers and scientists/engineers. For example, 84 per cent of scientists/engineers felt that their organisation had benefited through links with their local community, 79 per cent felt great satisfaction from doing something worthwhile, 74 per cent had received an insight into science education and over a third felt their communication skills had improved.

For teachers, the scheme gave them the room to be creative beyond the curriculum, the opportunity to use equipment not normally available to them, and the chance to gain new scientific knowledge and learn the latest techniques. Teachers felt their pupils benefited in a variety of ways—86 per cent had gained improved practical and thinking skills and an increased interest in science, and 71 per cent had a better understanding of "real" science and the scientific process. The evaluation also found that 86 per cent of teachers were planning to develop their project further, suggesting that the scheme is having a long-term impact.

The Acclaim project

The Acclaim project was launched in 2000 to raise young people's awareness of cutting edge scientific research in this country and of the achievements of UK scientists. The focus of the project has been profiles of the work of six leading scientists and their research teams:

- Frances Ashcroft FRS, University Laboratory of Physiology, University of Oxford.
- Francesca Happé, Senior Cognitive Psychologist, Institute of Psychiatry, King's College London.
- Paul Nurse FRS, Director General, Science, Cancer Research UK, and joint winner of 2001 Nobel Prize for Physiology or Medicine.
- Stephen Sparks FRS, Director, Centre for Environmental and Geophysical Flows, University of Bristol.
- Kevin Warwick, Professor of Cybernetics, University of Reading.
- Chris Wise, Professor of Creative Design, Imperial College of Science, Technology and Medicine.

Bespoke curriculum resource materials for 11–16 year-olds have been developed for the project, including case studies and pupil activities based on each of the six Acclaim scientists. The materials focus on "scientific enquiry" and the National Curriculum. The six Acclaim scientists also feature, at work and at home, in a six-part television series "Living Science" which was broadcast on Channel 4 schools' television in February 2001. The response to the series was so favourable that it is likely to be repeated later this year. The Acclaim scientists and engineers also gave public lectures around the UK, aimed particularly at secondary school pupils.

Since the start of the project, more than 550 curriculum packs (including videos of the "Living Science" series) have been purchased by English schools, representing about 15 per cent of secondary schools. Further curriculum materials and up-to-date information about the Acclaim project are available on the website: http://www.acclaimscientists.org.uk.

Promoting education at the Summer Science Exhibition

The Society's annual Summer Science Exhibition provides a unique opportunity for school pupils and their teachers to meet leading scientific researchers from around the UK. Visitors to the Exhibition can find out about the latest developments in science and technology through "hands-on" displays and discussions with researchers. The Exhibition is particularly suitable for students aged 16 or older who have an interest in science or who are considering science as a career.

In 2001, advance registrations for the Exhibition were received from about 800 post-16 students from schools across the UK, including Leeds, Nottingham, Sheffield, Stafford, Derby, Yeovil and Taunton. An analysis of completed evaluation forms showed three-quarters of students agreed that the Exhibition made them more interested in science, and 75 per cent of teachers found that they picked up new information by attending.

Other educational resources and activities

In addition, the Society supports a number of education initiatives organised by other bodies. In 2001, these included:—

- the Nuffield School Science Bursaries scheme, in which sixth form students develop their scientific knowledge and skills by working alongside scientists during school summer holidays;
- the feasibility phase of the "Perspectives on Science" project which aims to create a new AS level qualification in the history and philosophy of science;
- a video and curriculum material describing the volcanic eruption on the Caribbean island of Montserrat, produced by Professor Stephen Sparks FRS;

- the Salters' Institute Chemistry Camps initiative, which seeks to raise the profile of chemistry among 14–15 year-olds and to build links between school, industry and university;
- a feasibility study exploring the concept of a Science Academy where gifted and talented students would work on scientific problems with mentors from universities and industry;
- the British teams participating in the Mathematics, Physics and Biology Olympiads, international competitions for the most able sixth-form pupils; and
- the British Association Science Fair, concluding a national competition that encourages 14–19 year-olds to develop and present science and engineering projects — the Fair is held at the Royal Society, where finalists display their projects to school groups and other interested parties.

APPENDIX 6: ANALYSIS OF ROYAL SOCIETY FUNDING BY SOURCE AND PROGRAMME 2001–02

Activity	*PGA Funding (£k)*	*Level of Activity Supported by PGA*	*Non PGA Funding (£k)*	*Level of Activity Supported by Non PGA*
Research Support				
Professorships	781	12 professors	250	5 professors
University Research Fellowships	9939	310 fellows	423	12 fellows
Dorothy Hodgkin Fellowships	825	40 fellows	660	22 fellows
Industry Fellowships	200	21 fellows	326	17 fellows
Japan Fellowships	87	7 fellows		
Research Support	4022	236 grants		
Wolfson/OST Merit Award	200	35 awards (1)	1800	18 awards
Wolfson Refurbishment			2475	20 grants
Mercer Innovation			400	4 awards
Ambassador Programme			15	For alumni
Leverhulme Fellowships*			213	7 fellows
External Funding (2)*			115300	generated by our researchers
TOTAL (£k)	**16054**		**121862**	
International Support				
Europe	1000	149 grants + 90 projects	600	38 grants
Russia etc	600	159 grants + 50 projects		
Far East	725	90 grants + 97 projects	629	47 grants
Australasia and Canada	325	68 grants	410	10 grants
India South Africa & others	600	145 grants	61	4 projects
Conference Grants	850	1250 grants		
Overseas Research Projects	126	3 projects		
Relations with academies overseas	20		20	
International subscriptions	280	36 subscriptions		
ICSU Grants	128	50 grants		
International Seismological Centre	70	grant		
Academia Europea	75	grant	310	*
Partner funding for International work (3)*			4900	
TOTAL (£k)	**4799**		**6930**	
National Science Support				
Small Research Grants	1850	350 grants	108	27 grants
History of Science	78	4 Projects		
Science Communication and Education	810	40 educational grants3 special grants Support for Science in Society	635	35 Education grants support for Science in Society
Soiree			35	3 events
Meetings and Lectures	180	14—2 day International meetings	36	15 events
Science Advice	100		189	
Medals and Awards			36	14 awards
Library			250	
TOTAL (£k)	**3018**		**1289**	

Activity	*PGA Funding (£k)*	*Level of Activity Supported by PGA*	*Non PGA Funding (£k)*	*Level of Activity Supported by Non PGA*
Support Costs				
Rent	306			
External Redecoration (4)	230			
Operating Costs (5)	1538		2497	
TOTAL (£k)	2074		2497	
GRAND TOTALS (£k)	**25945**		**12697**	Direct expenditure
			120723	Third Party

Notes:

* These are third party expenditure.

(1) Relates to awards in 2002–03.

(2) External funding attracted by RS Professorships and Fellowships.

(3) Funding for International Exchanges Programme provided by Partners.

(4) This element only occurs every four years.

(5) This is the element which pays for the administration of publicly funded programmes.

APPENDIX 7: REGIONAL DISTRIBUTION OF RESEARCH APPOINTEES

	Total	*RP*	*RM*	*LT*	*U*	*DH*	*Pvt*	*IF*
Aberdeen	1				1			
Bath	9		1	1	6	1		
Belfast, Queen's	2				2			
Birmingham	7	1			6			
Bristol	12	1			8	2		1
Cambridge	72	6			49	13	4	
Coventry	1					1		
Dundee	5	2			3			
Durham	10			1	8	1		
East Anglia	6				4	2		
Edinburgh	17	1			15	1		
Glasgow	6			1	4	1		
Keele	1				1			
Lancaster	2				2			
Leeds	12				10	1	1	
Leicester	10	1			6	1	1	1
Liverpool	5				3	2		
Liverpool, John Moores	1				1			
London*	78	1	6		55	12		4
Loughborough	1				1			
Manchester	9				7		1	1
Newcastle	6				5	1		
Nottingham	7				5	2		
Open	2				1	1		
Oxford	57	3		1	42	10	1	
Portsmouth	1				1			
Reading	2	1			1			
Sheffield	7				6	1	1	
Southampton	15				13	1		1
St Andrews	6				6			
Strathclyde	3			1	2			
Sussex	5				5			
Wales, Bangor	1				1			
Wales, Cardiff	7				5	1	1	
Wales, Swansea	1			1				
Warwick	10			1	8			1
York	10				10			
TOTALS:	**406**	**17**	**7**	**7**	**302**	**55**	**10**	**8**

	Total	*RP*	*RM*	*LT*	*U*	*DH*	*Pvt*	*IF*
*London breakdown:								
Birkbeck	3				1	2		
Imperial	23	1	1		16	4		1
King's	5				4	1		
LSE	1			1				
University of London (Millport)	1				1			
Queen Mary	4				4			
Royal Free	2				1	1		
Royal Holloway	2				1	1		
St George's	1				1			
UCL	36		4		26	3		3
TOTAL:	**78**	**1**	**6**		**55**	**12**		**4**

Key: RP = Research Professors; RM = Research Merit Awards; LT = Leverhulme Trust; U = University Research Fellows; DH = Dorothy Hodgkin Fellows; Pvt = Privately funded postdoctoral fellowships; IF = Industry Fellows.

An additional 11 Industry fellows are based at Ashford, Billingham, Bristol, Edinburgh, London, Nottingham, Southampton, Stevenage (two), Welwyn Garden City, Winchester.

APPENDIX 38

Supplementary memorandum submitted by the Royal Society

During its oral evidence session with the Royal Society on 8 May, the Committee requested additional information about the activities funded from our Science Communication budget and our monitoring policy regarding ethnic minorities. This information is provided below.

1. *Funding for Science Communication*

The Committee requested a breakdown by activity of the £810k of Parliamentary Grant in Aid that we spend under the heading of Science Communication (ie our public understanding activities) and for an indication of how much of this is spent in-house (Q 42). This information is presented below. Of the £810k, £180k is spent on Royal Society activities.

	£K
Grant to BA	185
Grant to RI	100
COPUS Grants Programme	105
COPUS Activities	105
Science and Technology and Industry programme	50
Education Grants to school-scientist partnerships	30
Support for educational activities (Science Olympiads, British Youth Science Fair, Acclaim project, website for 16-19 year olds)	90
Summer Science exhibition	55
Communications and media training for scientists	15
Royal Society Public Understanding Programme	75
TOTAL	810

2. *Ethnic minority monitoring*

The Committee requested details of the Society's monitoring policy with respect to ethnic minorities (Q 70).

2.1 *Staff*

It is the Society's policy to treat employees and job applicants fairly, regardless of gender, sexual orientation, age, ethnic origin or disability. An equal opportunities form, requesting information on age, gender, ethnic origin, marital status and disability, is included as part of our recruitment forms. This section of the application is removed on receipt and is not seen by the recruitment panel. A similar form is available for employees. An analysis of this information is presented to the Senior Management Team on a quarterly basis.

2.2 *Research Fellowship holders*

We started comprehensive equal opportunities monitoring for all our research fellowship schemes in October 2001 (prior to this we had only collected data on gender). The application forms for our awards include a form asking applicants to indicate their age, gender, ethnic origin and whether they are registered disabled. This form is separated from the rest of the application form and is not seen by those involved in the selection process. We intend to extend equal opportunities monitoring to other research support schemes (eg our research and conference grants) in the future. An analysis of this baseline data will be used to inform subsequent policy discussions in this area.

2.3 *Fellows of the Royal Society*

As stated in section 12.5 of our written evidence, we do not monitor for ethnicity among the Fellows of the Royal Society (FRS).

2.4 *Related activities*

Under our educational programme (outlined in Section 5.7 of our written evidence) the Society is working jointly with Sheffield Hallam University on the Acclaim Project, designed to raise young people's awareness of cutting edge scientific research in this country and of the achievements of UK scientists. The Acclaim project is funded jointly from private sources and our PGA, and among future developments of the project under consideration is a focus on scientists from the ethnic minorities as role models.

May 2002

APPENDIX 39

Second supplementary memorandum submitted by the Royal Society

ROYAL SOCIETY ACCOUNTS

A summary of our accounts approved by the auditors, is available on the website and gives a clear statement of our sources of income and our types of expenditure. The full accounts are printed and available on request from the Royal Society and this is made clear in the summarised accounts.

COST EFFICIENCY OF RESEARCH FELLOWSHIP PROGRAMMES

I believe this request was put to the Royal Academy of Engineering rather than ourselves. However, I understand from a discussion with you that you want figures about the cost of administering our research fellowship programmes and briefly these are: percentage of our parliamentary grant spent on administering our research fellowships is 3.17 per cent (excluding an element for rent) or 3.21 per cent (if rent is included).

COMPUTER SCIENCE

This note is to clarify the answer we gave on computer scientists who are Fellows of The Royal Society.

The Royal Society elects scientists in computing. Two of the 10 committees which deal with elections cover computing. They are Sectional Committee 1 (pure and applied mathematics, computer science) which covers software theory and is currently chaired by Professor Robin Milner, Professor of Computer Science in the University of Cambridge; and Sectional Committee 4 (engineering, technology, instrumentation, materials science, experimental fluid dynamics) which covers the application and hardware side and is chaired by Professor David May, Professor of Computer Science in the University of Bristol.

In 2002, two of the 42 new Fellows were elected in this area, Professor Stephen Furber, Professor of Computer Engineering in the University of Manchester and Professor John McCanny, Professor of Microelectronics in the Queens University Belfast. Last year we elected Professor Timothy Berners-Lee, 3Com Founders Professor, Laboratory of Computer Science, Massachusetts Institute of Technology and Professor Michael Patterson, Professor in the Department of Computer Science in the University of Warwick.

With the Fellowship as a whole, out of a total of 1245 Fellows we have about 50 computer scientists. A search of the Sackler database has revealed deceased "computing" Fellows and Foreign Members elected since the 19th century including, among others, such notables as Charles Babbage, Donald Watts Davies, Tom Kilburn, Jacques Louis Lions, Maxwell Herman Alexander Newman and Alan Mathison Turing.

Stephen Cox
Executive Secretary

5 June 2002

APPENDIX 40

Third supplementary memorandum submitted by the Royal Society

Thank you for your letter of 8 July 2002. I am glad you have already got the Jamieson Report and the draft Copus business plan (though I do not know who sent you the latter since none of the current Copus Council members was approached about its release). I hope these documents help you in understanding the Copus situation. I should stress the business plan is a draft. It incorporates the comments made by Dame Bridget before it was circulated to the Copus Council but it does not incorporate the comments made at the Council meeting itself.

As you requested, I enclose the original paper I prepared which was approved by the three bodies: the Royal Institution, the British Association and the Royal Society, which set up the new Copus. I also enclose the letter which I wrote to Dame Bridget about the constitutional arrangements. This letter was also agreed in advance by the three organisations. You will see in the letter that I offered to prepare a paper for the Copus Council in January 2002 but this offer was not accepted by Dame Bridget.

Finally, on the separate issue of international subscriptions, we currently pay a total of 51 subscriptions of which 17 have been partly delegated to invididual scientific learned societies with the intention of bringing them closer to the scientists who may be interested in their work. The process has taken place over several years. Unfortunately in that time subscriptions have risen and the actual savings this year compared with 1997 is £17k and is likely to disappear altogether next year. These small savings have been used to support other international activity.

Stephen Cox
Executive Secretary

16 July 2002

Annex

1. Review of COPUS

Over the past 12 months Copus has undergone a thorough review to see how and under what circumstances it could respond to the rapidly changing environment within which it now operates.

A report from the Office of Public Management (OPM) produced following extensive consultations with the scientific and science communications communities, unfortunately produced no uniformity of view about how Copus should adapt. A further major consultation exercise was necessary to come up with an agreed position. This included meetings of the sponsors, a paper to the House of Lords enquiry on Science and Society, exploration of various models for a new Copus and two major meetings in May and June to consult the existing Copus membership and the wider scientific community. It seems unlikely that there will ever be complete unanimity of view about the way Copus should develop but the following proposal for recasting Copus represents the most likely model to command general support although I am sure individuals will criticise us for either not going far enough or for being too radical. The proposal, subject to the outcome of the meeting on Friday, will be presented to the Royal Society Council (and to the Councils of the BA and RI) for approval in October.

2. The Change

The thrust of the changes are that Copus will increasingly concentrate on developing dialogue between the public and scientists, with its scope broadened and its membership changed to reflect the enormous changes in the environment within which it operates. The membership will be more inclusive than it has been in the past. Although the initials Copus will be retained, its name will be changed and one suggestion is "Copus: Science and the Public in Partnership". It is not intended at this stage to introduce some of the more radical proposals which have been suggested, such as elections of the Council, membership fees, etc, although these will clearly remain options for the new Council to consider should they so wish. The new Council will retain the best of its existing portfolio of activities and be charged with developing new innovative ways of encouraging greater public awareness of and confidence in science and scientists. It will, however, remain firmly based in the scientific community and will retain a strong responsibility for encouraging scientists to develop their communications skills. It will also retain links with the three sponsors as this gives it the status and the firm institutional base which such a Council needs if it is to have the impact it needs in its area of activity.

3. PURPOSES

The primary purpose of the new Council (Copus) will be act as a national focus for activity in science communication. It will:

- take a strategic view and offer leadership in the field of science communication;
- share and disseminate best practice;
- seek new ways of engaging the public in informed debate on scientific issues;
- support activities aimed at improving understanding of science amongst the wider public and improving scientists understanding of the concerns of the public;
- act as a point of contact for government and for the media in developing dialogue between scientists and the public;
- support local and national initiatives aimed at improving communication between the public and scientists; and
- encourage organisations to work together to develop a better dialogue.

4. ACTIVITIES

It is neither desirable nor realistic to expect the new Copus to do all that is implied by the descriptions of its purpose immediately, and as its work develops some aspects will come to the fore and perhaps others will be dropped. It will thus build up its work over time and in accordance with the wishes of its Council and the availability of resources.

The first major task of the Council will be to push forward the new agenda and in particular to identify and promote new ways of engaging the public in informed debate, explore the best means of developing a closer relationship with government and parliament.

It will be able to do this from a position of strength, using the Copus name and the range of existing activities, which it will continue to run. It will refocus these activities in the light of the changed agenda:

- Best Practice—Copus already produces first class best practice guides which will continue and it will, subject to resources, commission a study to see whether this role could be extended (by analogy with, for example, The Advertising Standards Authority) to produce a "charter mark" for good public understanding effort;
- Copus Forums—will be extended to include developing advice, opinion and information about key issues. The participating institutions will set the agenda for such meetings so that the ensuing proposals are widely accepted and implemented. It will operate at both practitioner and senior levels, bringing together the heads of all major institutions; it will also work with the practitioners who manage activities and schemes nation-wide;
- Policy development—Copus will bring together small groups to look at policy issues relating to the promotion of science and publish their findings. This activity will underpin the development of future strategy;
- Grants Programme—the Copus grants programme is more than 10 years old and has provided more than 1,000 grants. It is also an invaluable information resource; such information should be used to inform current priorities and strategy. The grants programme will devote a proportion of its resource to "responsive mode funding" and the remainder to identifying and supporting themes and topics that reflect current priorities, eg disability, careers, environment;
- Information—it is suggested by many that the science community is handicapped in its dealings with the media by lack of information. While some of the major organisations have an in-house media watch service, most of the smaller organisations do not and this leaves them exposed and vulnerable. The provision of an information service by Copus will help meet the criticism that the scientific community is always on the defensive because it does not spot issues in advance.

5. SECRETARIAT

The secretariat, for the next three years, will be located in the Royal Society and will comprise a full time Secretary plus assistance. The person recruited will work closely to the Council and, as at present, with the three sponsors. The financial resources will also for three years continue to come from The Royal Society and the position will be reviewed at the end of the period.

6. NEXT STEPS

Briefly the next steps are to:

- set up the new Council;
- constitute the Executive;

- recruit a secretary to Copus;
- consider undertaking a review of the effectiveness of the UK effort in PUS; and
- explore co-operation with the new science centres.

Annex 1

COUNCIL MEMBERSHIP

Proposed Council Membership

The new membership of Copus is proposed as follows:

This list is provisional for the present, not all the individuals have been approached.

Chairman	Dame Bridget Ogilvie
Members	Sir David Davies, FRS, Engineering
	Mr Keith Davies, Engineering
	Lord Turnberg, Medicine
	Dianne Garner, Medicine
	Sir Gareth Roberts, FRS, Learned Societies
	Dr Jack Gow, Learned Societies
	Dr Lawrence Smaje, The Wellcome Trust
	A N Other ?, The Wellcome Trust
	Carol Vorderman, Media
	Glenwyn Benson, Media
	Trevor Phillips, Media
	Dr Neil Chalmers, Museums sector
	A N Other, Museums sector
	Dr Gillian Thomas, Science Centres
	AN Other, Science Centres
	To be identified, Scottish Science)
	To be identified, Welsh Science)
	To be identified, Northern Ireland Science)
	To be identified, Younger Scientists
	Professor John Enderby, FRS, The Royal Society
	Stephen Cox, The Royal Society
	Professor Colin Blakemore, FRS, The British Association for the Advancement of Science
	Dr Peter Briggs, The British Association for the Advancement of Science
	Mr Winston Fletcher, The Royal Institution
	Professor Susan Greenfield, The Royal Institution

Options for other Members
NESTA
EPSRC
Politicians
Lay Members

Annex 2

Letter from Stephen Cox, Executive Secretary, Royal Society to Dame Bridget Ogilvie

I am writing following the conversation you had last week with Lord May to set out the position on Copus as we see it. At the last Copus Council meeting, the Jamieson Report on Copus Terms of Reference was discussed. The thrust of the early part of that report is that the Council members interviewed were very supportive of Copus's new direction and they were less concerned about corporate governance. Therefore, I am sure you were right to concentrate on governance issues at the meeting itself as I know you feel there is ambiguity which is holding Copus back. You, Stephen Speed and I met subsequently to take this discussion forward and I agreed to consult the BA and the RI about these discussions. I have done this and we are all agreed that the restructuring of Copus has gone well and its new focus is just what is required. The leaflet which Natasha Martineau has produced sets out the position extremely well and we support this. We concur with the statement in the Jamieson Report which said about Council members:

> Amongst those interviewed there was strong support for the vision of Copus as the national forum for science communication and public engagement. In the words of one Council member "Copus should be setting the national agenda. It should be identifying the problems and then defining

> solutions it would like to see others attacking. Its role is not as another funder of schemes". Some others put it . . . that (it) sets standards, promotes best practice and generally acts as an umbrella organisation.

As you know, Brian Jamieson offered two options for the Copus structure: Option 1, an unincorporated entity as at present and Option 2, an independent legal entity.

In its discussion Copus Council favoured Option 1 and it is this option which we (ie the RS, RI and BA) believe is the right way forward. We strongly support the new inclusive Council and see it as the major force for change. We think its current composition, which was only brought into being earlier this year, should be retained although there may possibly be occasions sometime in the future when the Council needs to add to its number.

It would be possible to pursue Option 2 ie to set up Copus as an independent legal entity.

The costs in both time and money to do this are substantial and the benefits are not immediately obvious. Indeed, there would seem to be real advantages in retaining close links with the original three sponsors. The Royal Society discharges the substantial responsibilities as employer of the two staff dedicated to Copus work, provides the financial, administrative, IT and other support for Copus and acts as financial guarantor. At the present time, I believe, it would be disadvantageous to Copus to sever these links and would be an expensive option which Copus is currently not resourced to undertake. This does, however, have, what some may regard, as a down side: it means Copus needs to conform to Royal Society procedures but that is necessary if the Society is to continue to provide the current level of support.

You will gather from what I have said that the Royal Society, the British Association and the Royal Institution wish to remain as the sponsors of Copus. We all believe it is in Copus's best interests and in the interests of the science communications community to have our whole-hearted support. We believe we still have much to offer an operation which we have built up over the years. It is not clear whether other organisations wish to become sponsors but my feeling is that at present most are content with being members of the current Copus Council and recognise that this may place certain limits on their actions (which were mentioned in the Jamieson Report).

The Jamieson Report raised several other issues which I wanted to touch upon briefly:

(i) the employment of staff. I believe the current arrangement works well: the Royal Society procedures are applied to the selection and appointment process itself and you, as Chair, are consulted on the selection of a suitable candidate. The individual's terms and conditions of service are those of the Royal Society;

(ii) the possibility of Council members other than the Royal Society contributing to Copus. I think this would be desirable and the Council should consider whether its members could make contributions to Copus but I do not see this as a priority at present. If it becomes feasible there is no difficulty over the Royal Society receiving these monies and earmarking them for Copus, indeed this is what we do in other operations we run;

(iii) the Copus grants are also important but Jamieson suggested that these are a potential distraction from Copus's strategic aims. Currently the grants are awarded by a panel which is appointed by the Council of the Royal Society. The grants are funded by OST and the Royal Society and the priorities are determined by these two bodies in consultation with Copus. The grants are administered by the Royal Society and awarded under the Copus banner. This structure seems to work well and I believe it should be maintained.

Council is now well set up and will gain strength from the work it does. The Council agreed the work plan at the last meeting and the priority is to deliver this plan. I am fully aware of the need for additional resources and I will arrange for an outline business case to be put to the next Council meeting which, if approved, will form the basis of a submission to OST.

I would very much welcome your comments on the general thrust of this letter and if you are in broad agreement, I am happy to prepare a short paper for the next Copus Council with the intention of putting governance issues to rest so that Copus can concentrate on its work.

APPENDIX 41

Memorandum submitted by the Royal Society of Chemistry

1. INTRODUCTION

The Royal Society of Chemistry is the largest of the scientific societies with a membership of 46,000. It is both a learned society and a professional body. The RSC was formed in 1980 following a series of amalgamations. It is incorporated by Royal Charter and is a registered Charity. A separate memorandum describing the activities of the RSC is attached.

2. Advice to Parliament and Government

2.1 The RSC is charged by its Charter to:

> " . . . to serve the public interest by acting in an advisory, consultative and representative capacity in matters relating to the science and practice of chemistry". It is uniquely placed to do so as it draws its membership from all branches of the discipline and across the full spectrum of professional practice. Its members are individual scientists. The RSC has no corporate members, nor is it permitted to act on behalf of members as a trades union.

2.2 The RSC provides advice and information to Parliamentarians in both Houses and of all parties through its Parliamentary Affairs Officer who operates a scheme that links Members of Parliament to RSC members resident in their constituencies (The Parliamentary Link Scheme) and also organises major scientific events in Parliament on behalf of the scientific and engineering community as a whole. Similar embryonic schemes are underway for the Scottish Parliament and the Welsh Assembly in Wales. The RSC also provides expert advice to both of these bodies and hopes to extend this to the Northern Ireland Assembly. The RSC makes formal submissions to Government Departments and Agencies, provides members to serve on expert groups and gives informal advice through contacts between RSC staff and government officials.

2.3 The RSC formulates its advice through networks of members with relevant expertise and its own information gathering. Members expect the RSC to provide information and advice and to do so without bias. The RSC's Council and governance structure provides quality assurance in this regard.

3. Public Understanding of Science

3.1 The RSC's contribution to Public Understanding of Science pre-dates Science Week: the RSC has been promoting science with the public for many years: it has run Chemistry Week biennially since the early 1980s. These weeks consist of events that bring our members, and others in the chemical community into contact with the public through lectures, demonstrations, media events and visits. The RSC supports Science Week with local activities and is supporting Science Year. Through its members the RSC regularly provides information and activities for the public on topical science issues. Our nationwide programme of Chemical Landmarks celebrates the historical chemical events that have occurred in the country.

3.2 The RSC acts a key information provider and source of expertise on scientific issues for the media calling upon our members, the resources of our extensive library and the wider chemistry community as appropriate. We are the first port of call on chemistry issues for the media.

3.3 The RSC has led the way in providing promotional activities for science on the web. The chemsoc web site [www.chemsoc.org] (and among its features the Visual Elements Periodic Table) has received worldwide acclaim for its beauty and its ability to promote chemistry to a non-science audience. The site itself is the leading chemistry site of its type in the world.

4. Funding

4.1 The RSC's principal sources of income, all of which are applied to its charitable activities, are:

- membership subscriptions;
- publishing (substantially learned journals); and
- investments.

4.2 From time to time the RSC is in receipt of relatively modest amounts of public funds (up to £100K) in the form of grants for specific projects. These are awarded following successful bids made in open competition.

Most of these projects have been in education and training where the RSC is uniquely placed to bring all sectors of education and employment together.

4.3 The RSC does not otherwise receive government funding nor does it consider that learned and professional societies should receive public funding for their core activities. Many bodies, including the RSC, act in an advisory capacity to government and view this as a core activity. It is essential that this advice is independent and seen to be so. Hence it is necessary that the bodies themselves, and any co-ordinating associations that act on their behalf should be financially independent of government.

4.4 The RSC receives the usual benefits that accrue through its status as a charity and benefits in kind through use of part of Burlington House for its headquarters and library.

4.5 The value of these benefits is more than offset by the contributions the RSC makes, in cash and in kind, through the voluntary efforts of the chemical community and to publicly funded activities. For example:

- the RSC spends £1 million per annum in support of chemistry teaching in schools;
- additionally, as the largest provider of inservice courses for chemistry teachers in the UK, an additional amount of £300,000 per annum subsidises course fees;

- the RSC's scientific journals rely heavily on volunteer effort. This and the RSC's pricing policy ensures that they cost substantially less than their commercial analogues, saving publicly funded libraries in the UK in excess of £1 million per annum;
- provision at a cost of over £500,000 per annum in Burlington House of one Europe's leading libraries for chemistry and an archive for important chemical collections that is accessible by all scholars and scientists; and
- the RSC has spent £600,000 over the last three years on the fabric of Burlington House over and above routine maintenance and running costs.

4.6 A further example of the contributions in kind the RSC makes is the approximately 5,000 days per annum contributed by RSC members to supporting the teaching of chemistry in schools through lectures, careers advice, participation in Chemistry at Work events for schools and the numerous activities promoting science with the public.

The Royal Society of Chemistry is both the learned society for chemistry and the professional qualifying body for chemists in the United Kingdom. It is one of the most prominent and influential independent scientific organisations in Britain. Through its 46,000 members, including academics, teachers and industrialists, the Society promotes the benefits of chemical science and the interests of chemists.

As the professional body for chemistry in the UK, the Society is responsible for maintaining advanced standards of qualifications, competence and professional practice amongst chemists. The Society assesses and accredits degrees and diplomas in chemistry and related courses in British universities, and awards Chartered Chemist status.

The Society plays a leading role in the science of chemistry, communicating cutting edge research and its applications through highly respected journals and a programme of international conferences, seminars and workshops. The Society actively promotes networking amongst the chemistry community through its specialist subject groups, Local Sections, Internet networks, industry-academia initiatives and other activities.

The Society is one of the world's major chemical publishing houses with a wide range of primary, secondary, and tertiary literature, including research journals, abstracts and indexes, educational publications and computer-based information services. Revenue generated from these activities is ploughed back into chemistry and into the Society's services for members.

The Society's educational activities provide information and training opportunities for both students and teachers. The Society is extremely active in determining the future of chemical education, seeking to influence Government by submitting evidence to Parliament and Government agencies, and anticipating developments in education policy.

Strong ties are maintained with government both at national and at European Community level. Formal contact with parliament is maintained through the Society's two parliamentary advisers and through its Link Scheme, whereby members of the Society are linked with individual Members of Parliament.

Achievements in chemistry are recognised by offering more than 40 endowed lectureships, medals and awards to those chemists who have made significant contributions to the advancement of a field of research. Some of the awards have industrial sponsors and many of the Society's awards are aimed specifically at younger chemists.

Members of the Society benefit from a wide range of services, including an individual subscription to *Chemistry in Britain*, career management advice, discounts on books and journals and conference fees, access to subject-based networks, and free access to the Society's two web sites www.rsc.org and www.chemsoc.org.

March 2002

APPENDIX 42

Second supplementary memorandum submitted by the Royal Society of Edinburgh (RSE)

The Royal Society of Edinburgh (RSE) is pleased to respond to the House of Commons Science and Technology Committee inquiry into government funding of the scientific learned societies. The RSE is Scotland's foremost learned society and Scotland's National Academy of Science & Letters. Although the Society is based in Edinburgh, its 1,200 distinguished Fellows are drawn from all parts of Scotland and beyond.

BACKGROUND TO THE ROYAL SOCIETY OF EDINBURGH

Although the Royal Society of Edinburgh was founded in 1783, under a Royal Charter granted by George III, for the "Advancement of Learning and Useful Knowledge" it is committed to playing its full part in helping the people of Scotland to meet the challenges of the twenty first century. The Society is an independent, non party-political body with charitable status. The Society embraces all disciplines in the Sciences and Letters, and its Fellows are elected from the full spectrum of the sciences, medicine, engineering and technology, education, law, the arts, humanities, social sciences, business, industry, the professions and public service. The breadth of this range of subjects gives the Society a multidisciplinary perspective that makes it unique among the United Kingdom's learned societies.

The Society's mission today remains "the Advancement of Learning and Useful Knowledge". In promoting learning and putting the multidisciplinary expertise of its Fellows to work for the good of Scotland, the Society has three functional goals:

- to serve as Scotland's national academy of science and letters—acting as a source of multidisciplinary, independent and expert reflection on matters of public relevance, as a catalyst for educational progress, and as a stimulator of lifelong learning;
- to support research and innovation in Scotland—acting in productive and effective partnership with a number of public and private providers of funding to support research and innovation and to sustain the excellence and usefulness of Scotland's research base;
- to act as Scotland's premier learned body—honouring outstanding achievement across all academic subjects, the professions, the arts, commerce, industry and public life.

The work of the Society has six major strands:

- independent policy analysis and advice—acting as an independent source of authoritative advice on matters of public relevance through a unique multidisciplinary perspective;
- communicating knowledge and understanding—communicating knowledge in order to foster lifelong learning, providing a forum for informed debate, engaging both the general public and specialists and improving the perception of research and careers in the Sciences and Letters;
- international activities—promoting the international activities of the Society as part of Scotland's scientific and cultural infrastructure in keeping with the international role that Scotland increasingly seeks to play through the devolution settlement;
- grants and awards—supporting advanced research and postgraduate studies, using the expertise of Fellows as a peer-review system to validate the allocations, to sustain the excellence and usefulness of Scotland's research base;
- commercialisation and innovation—encouraging the commercialisation of appropriate science-based research to fully exploit the scientific output of its universities and research institutes to the benefit of the national economy;
- the Fellowship programme—involving the Fellowship in the work of the Society in order to promote learning and put the expertise of Fellows to work for the good of Scotland.

Funding from the UK Government

The RSE has effected significant developments in areas of strategic importance to Scotland through partnerships with major charitable trusts, industry, government and academia. The RSE receives £278,000 grant-in-aid from the Scottish Executive Enterprise and Lifelong Learning Department, details of which can be found in the Forward Look 2001 of Government-funded science, engineering and technology. The Society also runs Research Fellowships funded by the Scottish Executive and other public, private and charitable bodies. In this context, the RSE in partnership with the Particle Physics and Astronomy Research Council (PPARC), ran in 2000 and 2001 PPARC Enterprise Fellowships across the UK, designed to encourage the commercialisation of PPARC funded research, with support of £179,000. These one-year Enterprise Fellowships, developed initially by the RSE in partnership with Scottish Enterprise, have equipped post-doctoral researchers, or younger lecturers, with the hands-on business knowledge to enhance the commercialisation potential of their own research. They encourage the establishment of new start-up companies and allow young researchers to devote time developing their research from a commercial perspective. PPARC will be continuing to fund the RSE for their scheme in 2002-04 with a further four Fellowships with the support of an additional £175,000. Scottish Enterprise has also recently announced a major expansion in the number of Enterprise Fellowships to be run by the RSE, with funding of £5.5 million for a further 80 new Enterprise Fellowships in Scotland.

The Role of the Learned Societies in Providing Scientific Advice to Government and in Communicating Science to the Public

The RSE recognises its growing obligations as Scotland's national academy of science and letters, and is committed to playing its full part in helping the people of Scotland, the UK and society more generally to meet the challenges of the twenty first century. A key activity of the Society, which is useful to the public, the Scottish Parliament and the Executive, is to act as an independent source of authoritative advice on matters of public relevance. The expertise of the RSE's Fellows is the foundation for bringing a multidisciplinary perspective to bear on the formation of public policy. From April 2001 to March 2002 the RSE responded to 41 requests for comment on proposals prepared by Government Departments, committees of inquiry, Parliamentary committees and other bodies. The RSE also proactively undertakes a number of independent inquiries on matters of importance to Scotland, with recent examples including an inquiry into Foot and

Mouth Disease in Scotland, the Scientific Issues Surrounding the Control of Infectious Salmon Anaemia in Scotland, and Encouraging Resolution: Mediating Patient/Health Service Disputes in Scotland.

With financial support from the Scottish Executive, the Society also ran, during 2000–01, a series of public policy seminars to inform public policy development and decision-making. These involved Scottish Executive, Ministers and officials, Scottish Parliamentarians and the public, as well as practitioners in the academic, private and voluntary sectors. They provided a platform for open informed discussion on public policy issues on key issues affecting Scotland's future economic, cultural and social development. Topics included the active involvement of older people, educating through inclusive schooling, twenty first century challenges and changes of renewable energy, and urban transport congestion.

Another intensive activity of the Society is communicating knowledge in order to foster lifelong learning, providing a forum for informed debate, engaging both the general public and specialists and improving the perception of research and careers in the sciences and letters. The Society's Meetings and Events Programme, together with the Young People's Programme, are all designed to meet different aspects of these needs effectively.

In late 2001 the Scottish Executive launched a Science Strategy for Scotland for the support and use of science to achieve the Scottish Executive's objectives. Two of the strands of the Strategy are to ensure the effective use of scientific evidence in policy formation and resource allocation by government; and to promote the awareness, appreciation and understanding of science across society. As part of this Strategy the Executive has decided there should be a Scottish Science Advisory Committee, independent of the Executive and established under the auspices of the RSE. The person appointed by the RSE to Chair the Committee has, *ex officio,* become the Chief Advisor on science to the Scottish Executive. The decision to ask the RSE to establish this important new committee is a clear reflection of the RSE's standing as Scotland's National Academy. This Committee will provide advice to Scottish Executive Ministers on science strategy, policy and priorities to allow the Scottish Executive to make effective use of available scientific advice, knowledge and techniques in formulating and implementing policies to support the full range of its objectives. Specific activities will include: advise on strategic priorities for science across the Executive's responsibilities; provide an overview of the provision and use of science in Scotland and advise on ways of increasing public knowledge and understanding in relation to science and science based issues.

The Society also enjoys good relations with UK and international academies. In terms of international activities, the RSE hosts visits to Scotland from representatives of overseas bodies and has developed special relationships and joint activities with national academies overseas. This includes establishing agreements of scientific co-operation, for example, with China, Taiwan and Poland. The main thrust of these being to facilitate an exchange of scientists and researchers to and from Scotland. It also organises a two-way flow of Caledonian Research Foundation Visiting Research Fellowships between Scotland and continental Europe.

June 2002

APPENDIX 43

Memorandum submitted by the Science Council

GOVERNMENT FUNDING OF SCIENTIFIC LEARNED SOCIETIES

The Science Council, which counts amongst its members 18 professional scientific bodies and learned societies, is pleased to have the opportunity to respond to the House of Commons Science and Technology Committee's inquiry into Government Funding of Scientific Learned Societies.

The Science Council acts as an independent co-ordinating body for organisations representing professional scientists in UK. Its purpose is to promote the collective knowledge, resources and achievements of its constituent professional bodies and learned societies. The activities of the Science Council reflect the commitment of its constituent bodies to serve the public interest as encompassed in their charters and charitable objectives.

Neither the Science Council nor its constituent members receive designated core funding from government although most benefit from grants for specific projects or public engagement activities. While there is a view that a small proportion of the science funding might be allocated among scientific learned societies to enable them to expand the excellent work they undertake, the majority value their independence and would not argue for any major changes in the government funding structure.

The Science Council has strong and valued links with the Royal Society and the Royal Academy of Engineering. We consider that the use of their funds to support research in universities, to communicate the benefits of science programmes and to advise government on major issues involving science is appropriate and relevant. With concern about sufficient supply of scientists and engineers for the future of the UK economy, we appreciate the importance of the RS and RAEng efforts help to encourage good young scientists and engineers to develop a secure career and to stay in research and development in UK. We would encourage them to expand their links with the professional science, technology and engineering community and to take a more global perspective. Science and engineering play an increasingly important part in everyday living so strong, reliable sources of independent advice to government must be maintained.

The Learned Societies also have extensive resources of knowledge and expertise that they are keen to share for the public good and we would urge Government to make greater use of these resources, either through the Science Council or directly with the Institutes and Learned Societies for advice on their specific scientific areas. The breadth of these independent sources of advice to government would enhance and complement that obtainable from the government-funded bodies. The Science Council also seeks a strong future for science education for future scientists and for greater scientific awareness in the population at large and would welcome the opportunity to provide advice and expertise in these areas.

April 2002

APPENDIX 44

Memorandum submitted by the Society for General Microbiology

SUMMARY

The Society for General Microbiology (SGM) supports the concept of Government funding of the Royal Society for specific purposes, and believes that the Royal Society gives good value for money in these activities. As the national academy of sciences it is the appropriate channel for this funding.

SGM does not receive Government funding, but supports its activities from membership subscriptions, publishing and investment income. The Society regards its independence and freedom to act in the best interests of the science of microbiology and the community of microbiologists as of paramount importance.

SGM provides advice to Government, in the form of evidence and opinions to inquiries and consultations, and nominates experts to serve on committees. The Society makes great efforts to communicate information about the importance of microbiology in today's world to schools, the general public and opinion formers, and devotes significant resources to these ends.

1. *Background: microbiology is important*

Microbiology is a dynamic and fast-moving subject. Microorganisms affect our health, food and environment, and are important in many industries.

In terms of health, new infectious agents such as HIV, Ebola virus and BSE/vCJD continue to emerge. The development of antibiotic resistance in existing pathogens is a continuing and major concern. Microbes are becoming implicated in chronic diseases such as duodenal ulcers and stomach cancer. Climate change may cause some infectious diseases to extend their geographical range. For example, TB and malaria are increasing their impact alarmingly. There is a real threat from biological terrorism. The Chief Medical Officer's new strategy on the control of infectious diseases emphasises the need to strengthen microbiological services including surveillance and diagnosis, and also the need for research on the development and introduction of new vaccines. The recent outbreak of foot and mouth disease emphasises the need to strengthen veterinary microbiology in the UK.

The Government has identified the biotechnology industry as of growing importance for our economic development. Microbes of many types are essential tools in the development of new prophylactic and therapeutic medicines, and may play an increasing role in crop protection and cleaning up the environment. The success of biotechnology depends on scientists with knowledge of modern molecular biology and genetics, both of which have to be underpinned by microbiological training.

2. *The Society for General Microbiology (SGM)*

The Society, founded in 1945, is the largest microbiological society in Europe, with over 5,600 members. 75 per cent are resident in the UK; the remainder are in more than 60 other countries. Almost all full members are qualified to doctoral or higher level, and there are 850 postgraduate student members. A recently introduced category of corporate membership for schools is growing rapidly. The Society provides a common meeting ground for scientists working in academic centres and those in medicine and health care, veterinary medicine, pharmaceuticals and numerous other industries, agriculture, food and beverages, the environment and education. The Society is a registered charity and a company limited by guarantee; it employs 30 people. It is governed by a Council drawn and elected from the membership.

The Society's objective is to advance the art and science of microbiology. It does this by:

- organising regular international scientific meetings. The largest last 5-6 days and involve over 1,000 participants;
- publishing four major international learned journals: *Microbiology, Journal of General Virology, Journal of Medical Microbiology and International Journal of Systematic and Evolutionary Microbiology, the SGM Symposium Series* books, and the award-winning magazine *Microbiology Today*;

- representing and publicising the science and profession of microbiology to government, the media, the public and schools;
- providing grants to support the career development of young microbiologists, and projects in developing countries.

3. *Comments on Government funding of The Royal Society*

The Royal Society is not a "typical" learned society, in that it has additional roles as the UK national academy of science. This makes it an appropriate body to receive Government funding; its prestige and the quality of the fellowship guarantee the necessary independence of thought and action.

The activities funded by Government through the Royal Society are a valuable component of the fabric of UK science. Their nature makes it appropriate that they are funded through the Royal Society rather than through other routes such as the Research Councils. In particular:

- The Royal Society fellowships for UK and overseas scientists are important means of recognising, recruiting and retaining talented individuals for UK science;
- Royal Society interactions with the national academies of science of other countries, and with the International Council of Scientific Unions, provide a framework for international interactions by other UK learned societies;
- Royal Society support for international conferences, and travel grants to attend them, are valuable to SGM members;
- we hold in high regard the Royal Society's work in science communication and education, in research into science education, and in briefings and one-off inquiries.

4. *Government funding of other learned societies*

SGM does not receive Government funding for its core activities, and would only consider accepting it if the independence of the Society was not compromised in any way. We regard learned societies based on scientific disciplines—such as microbiology, endocrinology and pharmacology—as important components of the intellectual and enterprise fabric of the country. Learned societies are of value to society as a whole because they are different. They represent professional communities with roots in many types of organisations, and in coherent sectors of science, but retain independence of Government, universities, Research Councils and industry. As responsible but unconstrained independent bodies, they can target their activities for maximum effect and public value. This independence is particularly important for emphasising the social, intellectual and economic importance of the scientific discipline, in a time when we have seen the emergence of a virulent culture of "antiscience" and public distrust.

The Society has adequate income from its membership subscriptions, publishing business and investments, to support its charitable and professional activities. Prudent management has allowed the accumulation of sufficient reserves to sustain these activities in the event of changes in economic or other conditions.

5. *SGM provides advice to Government and other bodies*

The Society submits evidence and opinion to Select Committee and departmental inquiries and green papers etc. We have recently increased support for such activities by the appointment of a full time Public Affairs Administrator and a Professional Affairs Officer on Council.

Where advice or opinion is required on more generic issues affecting wider aspects of biology, or scientific education, SGM co-operates with appropriate umbrella bodies such as the UK Life Sciences Committee and Institute of Biology in preparation of collective responses. But where the issue focuses on microbiology, the Society will take a leading role and respond directly, as this is the most efficient way of producing a quality response. Where appropriate, there is consultation with other learned societies within the discipline of microbiology.

SGM Council nominates individuals for membership of expert committees, such as the Advisory Committee on Dangerous Pathogens, and the Spongiform Encephalopathy Advisory Committee. The Society has a very broad knowledge of the microbiology community in the UK, which together with its independence, makes it a good source of quality and unbiased nominations.

6. *SGM communicates science*

SGM aims to communicate accurate information about microbiology to all sectors of society through a wide range of activities. We employ professional staff and allocate significant funding to achieve this objective:

- promotion of microbiology in schools at Key Stages 1–3 and post-16 through the production of teaching resources, INSET training, advice to teachers, pupils and technicians, sponsorship of competitions, attendance at exhibitions for science teachers and the organisation of lecture programmes for schools. The Society offers Schools Corporate Membership and runs an educational website www.microbiologyonline.org.uk. Grants are also available to members wishing to organise education projects in schools. We also collaborate widely with other bodies engaged in science education and act as the secretariat for the Microbiology in Schools Advisory Committee;

- communication of microbiology to the general public is achieved by organising debates and lectures, encouraging members to participate in a national database of speakers on microbiology, and responding to enquiries by telephone, letter, fax and e-mail. SGM regularly organises activities at National Science Week, the Edinburgh Science Festival, other large events and on behalf of the Royal Institution and the British Association;
- promotion of careers in microbiology through the wide distribution of leaflets, posters and factsheets, attendance at careers fairs for schools and provision of a dedicated website: www.biocareers.org.uk. A large number of enquiries is dealt with annually at SGM headquarters. The Society collaborates with other life science bodies in running one day careers conferences for final year university and postgraduate students.

Microbiology in the News, a digest of current reports in the media, is maintained on the SGM website www.sgm.ac.uk. SGM issues regular media releases based on papers published in its learned journals and delivered at its conferences, together with occasional briefing notes on topical issues. Assistance is also provided to broadcasters making documentaries and journalists preparing review articles. SGM members are encouraged to undergo media training. A register of experts who can give advice when required is maintained.

April 2002

APPENDIX 45

Memorandum submitted by the Department for Transport, Local Government and the Regions

The Rent Paid by the Learned Societies at Burlington House

The Learned Societies which occupy accommodation at Burlington House are: (a) the Royal Society of Chemistry; (b) the Royal Astronomical Society; (c) the Geological Society; (d) the Linnean Society; and (e) the Society of Antiquaries. They currently pay no rent.

An estimate of the commercial rent which could be charged to the Learned Societies at Burlington House

The Department was advised in 2001 that the rental value of the premises occupied by the Learned Societies was:

Learned Society	*Estimated Rental Value*
Royal Society of Chemistry	£441,000
Geological Society	£315,000
Linnean Society	£164,000
Royal Astronomical Society (including the British Astronomical Association)	£176,000
Society of Antiquaries	£221,000
Total	£1,317,000

The origin of the occupation by the Learned Societies at Burlington House and the rationale underlying the arrangement

As the Department understands it, the Society of Antiquaries, the Royal Astronomical Society and the Geological Society were provided with accommodation at Somerset House in the late 1700s and early 1800s. In the 1870s those Societies left Somerset House and moved into accommodation in Burlington House. The other Learned Societies mentioned above, the Chemical Society and the Linnean Society, were not in Somerset House and they were provided with accommodation in Burlington House in the late 1850s.

The Crown owns the freehold of Burlington House and DTLR is responsible as it is the holding Department. Legal advice obtained by the Learned Societies suggests that they might have a freehold interest in Burlington House and/or be able to stay in the property on a rent free basis. The Department does not accept this, based on legal advice.

Because there is this difference of view between the Department and the Learned Societies—as to the extent of the Learned Societies' interest in Burlington House—H M Land Registry has indicated that there will need to be an application to the courts for the issue to be clarified. It is also important for the Department to know the legal position in order to comply with H M Treasury's new Resource Accounting arrangements, which mean that the Department must account for Burlington House in its accounts, and to meet the National Asset Register requirements. To do this the Department needs to have the ownership issue clarified. There are other public accountability issues which the Department also needs to see resolved, such as health & safety and responsibility for major repairs, since it would not be appropriate for the Department to embark on a major capital expenditure programme while there is uncertainty over the status of occupation of Burlington House. While the Societies occupy their accommodation rent free the Department is responsible for the maintenance and necessary improvement of the building. This is very difficult to justify in terms of the proper use of public funds.

The origins and rationale form part of the history of how Learned Societies came to occupy Burlington House in the middle of the nineteenth century. This history is relevant to the Department's legal position. The interpretation of that history and its presentation to the court by counsel will influence the result of the outcome. The Department is aware that the Committee will wish to receive information on the resolution of this matter and will therefore keep the matter under review with respect to providing further information.

April 2002

APPENDIX 46

Memorandum submitted by the UK Life Sciences Committee

THE ROLE OF THE UK LIFE SCIENCES COMMITTEE

The UK Life Sciences Committee (UKLSC), which receives no government funding, and which is run on a very limited budget, has made a significant impact in the five years of its existence. It is influential in science policy with government and research funders, a leading voice on animal science issues, and is becoming increasingly recognised in the education arena.

The ethos of UKLSC has been to identify issues that need attention, that are not being addressed satisfactorily by others, and on which UKLSC feels that it can make a difference. To achieve its objectives UKLSC has always sought collaborations with other leading bodies in the medical and physical sciences. Its ability to secure such collaborations is brought out in this memorandum.

General information

1. UKLSC is an umbrella body representing 17 leading learned societies (see Appendix) comprising some 35,000 cell, molecular and physiological life scientists working in academia or in industry in the UK and abroad. Neither the UKLSC nor any of its constituent member societies receive government funding in the form of recurrent grants or subsidy of premises. Individual societies have been successful from time to time in winning small government grants to enable them to carry out specific projects.

2. The income of UKLSC societies derives almost entirely from publishing activities and from membership subscriptions. The activities of UKLSC are funded by a levy of societies on a stepped scale according to the number of members in individual societies. This brings in just over £17,000 which supports the science policy work of the main committee and a part-time committee secretary, and just over £16,000 which supports the work of the Animal Science sub-group and a part-time co-ordinator. The Animal Science Group invites external organisations having similar interests to attend its meetings and participate in its activities. The Royal Society is one of these, and donates an additional £3,000 to fund the work of the Animal Science Group. While UKLSC has only a small financial capitalisation constituent societies have much larger resources, and UKLSC can, of course, draw on the considerable scientific expertise present within member societies.

3. UKLSC serves the public interest by co-ordinating and advancing the interests of the life sciences in the areas of:

- Informing Government policy and other public policy regarding science and its funding;
- Education of scientists from school to post-doctoral level;
- Communicating science in the public domain;
- Monitoring developments in professional matters and career development, which might potentially affect the productivity of the scientific disciplines represented by constituent Societies;
- Exchange of information and co-operation in the planning and running of scientific meetings.

4. Further information about UKLSC and its Animal Science and Education groups can be obtained from its web site: http://www.uklsc.org.

Activities of the UKLSC

Science Policy

5. UKLSC responds consistently to consultations on science and education policy and the use of animals in research. In 2001 it made nine submissions: two to the Commons Science and Technology Committee, one to the Office of Science and Technology, one to the Treasury, two to Lords and Home Office committees dealing with animal issues, one to the European Commission, one to the Qualifications and Curriculum Authority, and one to the Higher Education Funding Council for England. It is often difficult to gauge the impact made by such submissions, but UKLSC evidence has been referenced in the reports of some inquiries and its current chair called to present oral evidence to an inquiry into the use of animals in research.

6. UKLSC is also proactive and has had considerable success in identifying issues and bringing together organisations from across the biological and chemical sciences to address them. For example:

— in 1999–2000 it brought together a Working Party to address issues in Postgraduate Training in the Life Sciences. Chaired by Sir Brian Follett, the Working Party had members from the Wellcome Trust, BBSRC, MRC, Royal Society, UK Council for Graduate Education, and the Association of the British Pharmaceutical Industry (ABPI). The Working Party report contributed to the OST decision to increase stipends for Research Council-funded PhD studentships.

— also in 1999–2000 UKLSC was the driving force behind the establishment of the Foresight Associate Programme for the Molecular Biosciences. The planning committee contained representatives from the Academy of Medical Sciences, Institute of Biology, Royal Society of Chemistry, UK National Committee for Microbiology and the ABPI. One of the objectives of the Associate Programme was to press the need for the country to develop expertise in biomedical informatics. The Programme organised a symposium in 2000 in which the leading players in the current BioBank large-scale population genetics study participated (Wellcome Trust, National Health Service, MRC). A second objective was to promote the need for a new programme of cross-disciplinary PhD studentships in biology and chemistry. UKLSC collaborated with the Royal Society of Chemistry to run a symposium 'Post Genomic Partnership for Chemistry and Biology' to highlight this theme in 2001. The EPSRC has introduced a new cross-disciplinary scheme that goes some way towards meeting the Associate Programme objective.

7. UKLSC is part of an informal discussion group of science policy managers that also includes the Royal Society of Chemistry, Institute of Biology, Institute of Physics and the Royal Society. Policy activities are co-ordinated and shared as far as possible. This helps science to speak with a single voice on issues that affect the whole scientific community, and avoid duplication of activities.

8. In submissions to the OST on obtaining and using scientific advice across government departments UKLSC has repeatedly said that it would be very happy to act as a source of advice and information. But it has not been approached, despite having among its members the leading UK learned societies in the fields of microbiology, nutrition, genetics, endocrinology, immunology and cell biology, which in turn have many of the country's most eminent molecular and physiological life scientists among their memberships.

9. UKLSC produces a monthly report on national and international science and education policy, gleaned from newspapers and science journals. The report is distributed on-line to the Heads of all UK University Biological Sciences Departments and to others with an interest in science policy. It has a large and appreciative readership.

Animal science and welfare

10. The UKLSC Animal Science Group (ASG) represents all major learned societies associated with biological and biomedical research. It is concerned with all aspects of the use of animals in fundamental research in the UK and aims to:

— Support and promote UK science and facilitate animal welfare and implementation of the 3Rs;

— Maintain close dialogue between scientists and groups interested in the use of animals in research including government, policy makers, the media and the commercial sector;

— Improve public understanding, awareness and education about the use of animals in research.

In order to maximise its effectiveness it invites a number of non-UKLSC organisations with overlapping interests to attend its committee meetings as full members or as observers, and actively seeks collaboration with them. Organisations currently attending in the latter category include the Academy of Medical Sciences, ABPI, Association of Medical Research Charities, BioIndustries Association, BBSRC, Institute of Animal Technicians, Laboratory Animals Science Association, Laboratory Animals Veterinary Association, MRC, Research Defence Society, Royal Society, and the Wellcome Trust.

11. The ASG functions both responsively and pro-actively. For example:

— the ASG caused a stir in 2000 by organising an open letter to the Science Minister signed by 110 leading biomedical professors. The letter drew attention to the effect on UK competitiveness of excessive bureaucracy and delay in the processing of animal licence applications by the Home Office. This led to a review of the system;

- in 2001 it submitted responses to the Lords Select Committee inquiry into the use of animals in scientific research and the Home Office Animal Procedures Committee inquiry into the cost benefit analysis included in Animal Licence applications. The Chair of the ASG was invited to present evidence orally to the Lords Committee. In 2002 the ASG made a submission focusing on undue bureaucracy in animal experimentation to the Better Regulation Task Force review of regulation in Science and Innovation;
- in 2001 the Chair of the ASG took part in an interesting public conference session entitled "Of Mice and Men" held at the British Association Festival of Science meeting;
- as one of its ongoing projects the ASG is conducting regular surveys among academic and research institute laboratories to learn whether recent changes introduced by the Home Office are being successful in shortening the turn-round time for Animal Licence applications. If not the ASG will go back to the Home Office with further recommendations on best practice.

The ASG is in continual dialogue with the Home Office with the aim of using the considerable expertise on which it can draw to help the Office fulfil its statutory obligations in this area. The Home Office Minister with responsibility for animal welfare accepted an invitation in 2001 to talk with representatives of UKLSC and to tour the animal facilities at a leading UK university. Representatives of the ASG were also invited to discussions with the Science Minister and others as part of the Pharmaceutical Industry Competitiveness Task Force.

Education

12. Many issues around science education in schools, and the provision of careers advice, are generic in nature and UKLSC societies co-operate among themselves and with other lead bodies wherever possible. The larger UKLSC societies having education managers also produce education resources, and undertake initiatives (eg teachers workshops, schools lectures), in their own right or again in collaboration with bodies such as BBSRC , the Wellcome Trust or the ABPI. Most societies have teaching and learning articles on their web sites that are of interest to schools and the public.

13. The UKLSC Education Group collaborates with the Institute of Biology, Royal Society of Chemistry and Institute of Physics in attending up to six schools careers fairs annually under the banner "Science Careers". The Education Group has recently produced an informative careers leaflet that describes the different disciplines in the life sciences, how to decide on a university course, the careers study can lead to, and where additional advice can be obtained.

14. As its contribution to Science Year the Education Group has invited members of individual societies to add their name to a new on-line database of scientists who are prepared to give talks in schools. More than 200 are listed on the web site for school teachers Biology4all.com, with which UKLSC collaborates.

15. The UKLSC Education Group organises three annual careers conferences at venues around the country for final year undergraduate and postgraduate biological sciences students. Each conference is typically attended by more than 200 students.

16. The Education Group also concerns itself with education policy and curricula issues. For example, in 2001:

- it contributed to the UKLSC response to the Roberts Review consultation on factors affecting the recruitment and retention of scientists and engineers;
- it was represented at planning meetings organised by the DfES on a new National Centre for Excellence in Science Teaching, and the Science Ambassadors scheme;
- it provided informed comment on the content of the new Salters/Nuffield A-level biology syllabus;
- it was a leading player in bringing together the team that produced the Biosciences benchmark for the Quality Assurance Agency;
- it collaborated closely with the Learning and Teaching Support Network group for the biosciences.

Science Communication

17. UKLSC considers this a crowded arena, and focuses its efforts on collaborating with and supporting other active agencies. The Education Group organised the database of scientists prepared to visit schools, which is on-line and freely available, and provides input to curriculum discussions aimed at making science interesting for all students. Through its collaboration with the Learning and Teaching Support Network it supports the training of graduates equipped with the transferable skills necessary to communicate with the public. The Animal Science Group has improving public understanding, awareness and education about the use of animals in research as a key element of its remit.

18. Individual UKLSC societies are more involved in organising activities involving the public and the media. Several of these have submitted separate memoranda to this inquiry which should be consulted for more detailed information. Examples of the activities of individual societies include:

— in 2001 UKLSC provided financial support for the Genetics Society and the University of Leeds to produce a video 'Genetic Engineering—Dreams and Nightmares' to explain the science and explore societal and ethical issues with GCSE science students;

— several societies write media releases on interesting topics ahead of their scientific meetings. This often results in radio interviews and articles in the national newspapers and more specialised journals such as New Scientist;

— some societies support sessions at the British Association Festival of Science, which is attended by science journalists. Through media releases and the science sessions themselves science stories are shared with the media throughout the week;

— several societies organise conferences and workshops on issues relating to science communication (eg on nutrition, genetic modification, biodiversity, women in science).

VIEWS ON THE ROYAL SOCIETY

The Royal Society is the flagship of British Science, which is recognised and respected internationally. It serves many important purposes. Amongst these the funding of research fellowships is worthy of particular note. The success of these has been outstanding, and the forthcoming report of the Roberts Review will recommend an expansion of such fellowships. The Royal Society was one of the first funding bodies to provide fellowships aimed specifically at helping women to balance research careers with family commitments.

Overall, the UK Life Sciences Committee fully supports the activities of the Royal Society and considers that it serves an essential function in UK science

April 2002

APPENDIX 47

Memorandum submitted by the Wellcome Trust

The Trust is pleased to have the opportunity to respond to the Committee's current inquiry. The focus of our response will be concerned with the funding and role of the Royal Society, with whom the Trust has most contact.

The Trust is an independent, biomedical research-funding charity, established under the will of Sir Henry Wellcome and funded from a private endowment, which is managed with long-term stability and growth in mind. Its mission is to foster and promote research with the aim of improving human and animal health. One way the Trust seeks to meet its mission is by stimulating an informed dialogue to raise awareness and understanding of biomedical science, its achievements, applications and implications, through both science education and public engagement activities.

As members of the Committee will be aware following their recent visit to the Royal Society, the Grant-in-Aid budget of c£26 million per year provided to the Royal Society by the Government is used to support a range of activities. The budget not only supports Fellowships but also other personal awards, funding for research grants, maintenance of relationships with similar learned bodies overseas, communication and education programmes and the provision of independent and timely scientific advice to the Government on key issues of relevance to science, society, scientific education and the climate for scientific research.

The prestigious nature of the Royal Society's personal awards is able to attract international, world-class scientists to work in the UK and consequently such awards add significant value to the UK science base.

The Royal Society is an organisation with a world-wide reputation for its activities and the Trust considers that its work in communication and education, in particular the Science in Society events, makes a valuable contribution to the UK's activities in this area.

In addition, the Royal Society contributes independent, authoritative and timely science advice on a wide range of issues affecting science and society in the UK, as well as contributing to wider debates on such issues where they have a European or international impact. The Trust itself provides some small support for the Society's activities in this area through its sponsorship of a Wellcome Trust Fellow in the Society's Science Advice Section.

The Trust believes that the independent, expert advice of learned societies such as the Royal Society, in addition to the contribution of charities and industry, helps to improve public-policy making on scientific issues.

Therefore, the Trust feels that the provision of Grant-in-Aid by the Government to the Royal Society is entirely appropriate, in order for the Society to continue to provide such a valuable contribution, both to the scientific research base of the UK and to the continuing dialogue surrounding science and scientific issues.

Financial support for the work of the Royal Society should therefore remain a key responsibility of the Government.

Members of the Committee should note that, whilst my Fellowship of the Royal Society may be considered a conflict of interest, the points made above reflect the views and opinions of colleagues across all divisions of the Trust.

Dr T Michael Dexter FRS
Director

March 2002

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Director

March 2002

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